

# HOME GYMNASTICS

For the Well and the Sick

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*FROM THE EIGHTH GERMAN EDITION*





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# HOME GYMNASTICS

For the Well and the Sick

ADAPTED TO ALL AGES AND BOTH SEXES; WITH DIRECTIONS  
HOW TO PRESERVE AND INCREASE HEALTH; ALSO  
HOW TO OVERCOME CONDITIONS OF ILL HEALTH,  
BY SIMPLE MOVEMENTS OF THE BODY

EDITED BY

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OF THE CITY OF BERLIN

AND BY

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TEACHERS OF GYMNASTICS

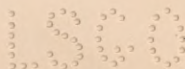
*WITH MANY WOOD-CUTS AND A FIGURE PLATE*

Translated from the Eighth German Edition



BOSTON AND NEW YORK  
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## PREFACE.

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THE work before us is intended for laymen and for use without a teacher. Therefore only such movements have been treated as can easily be made intelligible by description and drawings.

We have chosen almost entirely free movements, and refrained from such as require special apparatus.

The duplicated resisting and passive movements of gymnastics used for curing disease have also been excluded, because these should be performed only under the direction and control of a professional and with the coöperation of a graduate of a gymnastic institution.

We are not, however, unmindful of the fact that these forms of gymnastics may be applied with great success in many cases of disease specifically developed, as has been the practice for years in well conducted institutions established for the purpose.

The Exercises of "Home Gymnastics" are primarily for the purpose of preserving and increasing health, thus warding off sickness; in many cases, however, they can also be used as a cure in certain conditions of ill health, such as weakness of the organs of respiration, abdominal stagnations, corpulence, etc. But in every case where an indication of ill health manifests itself, the advice of a physician should be obtained before using "Home Gymnastics."

The names chosen for the exercises are those in use in the schools, and intended to be self-explanatory.

We have scrupulously recognized existing works, particularly Ernst Eiselen's "Dumb-bell Exercises," third edition, revised by Dr. Karl Wassmannsdorff; and last, but not least, Dr. Schreiber's "Medical Room Gymnastics." We have gone, however, far beyond Dr. Schreiber's and similar works in regard to the number of different exercises, and in other respects.

The illustrations have been prepared by means of photographs taken especially for this purpose, and are therefore pictures from life of exercises actually performed.

A comprehensive view of the Figures printed in the text, and a complete index of the Exercises, have been added to the book in a separate plate, thereby materially facilitating a ready acquaintance with the Exercises prescribed in each of the groups.

BERLIN, *October*, 1887.

THE AUTHORS.

## PREFACE TO THE SECOND EDITION.

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THE kind reception given to the "Home Gymnastics" has rendered necessary a second edition only a few weeks after the appearance of the first. In this second edition the historical part of the Introduction has been enlarged, some of the descriptions of the Exercises have been more sharply defined, and one addition to them has been made.

For favorable opinions expressed and advice given by Dr. E. Friedrich of Dresden, Director, Dr. I. C. Lion of Leipzig, Dr. Karl Wassmannsdorff of Heidelberg, and others, we here express our sincere thanks.

BERLIN, *November*, 1887.

THE AUTHORS.

THE eighth edition is an unaltered reproduction of the sixth edition.





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# HOME GYMNASTICS.

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## FIRST DIVISION.

### HOME GYMNASTICS IN GENERAL.

---

#### I. INTRODUCTION.

“*MENS sana in corpore sano*,” — a healthy mind can dwell only in a healthy body, — is an old proverb the truth of which has never been doubted. Man can attain complete development and health only when his various powers are exercised equally and brought into harmonious action. Active exercise develops, increases, and improves every bodily power ; while a power which remains unused becomes weaker, and eventually disappears altogether.

Where the conditions of life are simple, a certain harmony of mental and bodily activity comes into play. People engaged in cattle-breeding and agricultural pursuits are not exposed to frequent excitements of mind or temper, nor to exhausting mental work ; while the diversity of their occupations affords sufficient opportunity for exercising their bodily powers in many different directions. It is essentially different with the occupation of an artisan, who must aim at developing in the highest degree a one-sided bodily dexterity. This one-sidedness increases with greater subdivision of labor, in order that the product of his work may be obtained, as far as possible, easily, rapidly, and cheaply. The artisan must take care that the expenditure of his bodily powers on his work be held within bounds, in order that he may gain in endurance. He must limit as much as possible the number of organs called into activity, in order to prevent the excitement and complication of the whole system. For the strength



is overtaxed and too great exhaustion ensues when a great part of the muscular system is active, or there is an unusual tension of special muscles, especially as there is heightened activity not only of the heart and lungs, but also of the digestive organs. Nevertheless, the object of the exercise, the work in hand, is not promoted, but, on the contrary, through the excitement of the heart and the lungs a heat is produced which easily hinders work. The increase of thirst and appetite causes needless expenditure, and repeated gratification of both interferes with work. The conditions, then, imposed by the nature of the work are, that a large part of the bodily powers remains undeveloped, in order that the over-excitement of the whole organism, especially that of breathing and circulation, so necessary to health, may be avoided. Hence it must follow that for want of exercise the inactive or less active forces are liable to be lost. Therefore the work of an artisan, because it is one-sided, never acts favorably for the healthy development of the organism as a whole, and the more one-sided, the more narrowly circumscribed, the work is, the more unfavorably it acts.

Then, again, in other pursuits there are frequent cases in which mental demands are raised to a perilous height, while the powers of the body lie more or less undeveloped. We refer here to that class of merchants and manufacturers whose business demands rapid mental activity and the closest attention, often sorely taxing both heart and mind; to the public servant whose duties subject him to exhausting activity; and to the professional man who has to do hard thinking incessantly. In all these cases the physical life becomes degenerate and stunted under both the mental pressure and the bodily neglect, and by this degeneration in time a shadow is thrown on the disposition of the person as well as on his power of thought. The great lack of activity of the muscles and the habit of sitting required by the vocation bring about here also, and in a heightened degree, reduced activity of the heart, and of the organs of respiration and digestion, in consequence of their being insufficiently excited. Defective formation of the blood, troubles of respiration, delayed evacuations of the intestines, stagnation in the vessels of the abdomen (hemorrhoids), are the primary consequences. But by these the nervous system is influenced most unfavorably. Nervous sensibility and weakness appear, also

a depression and irritability of disposition (hypochondria and melancholia), which destroy freshness and cheerfulness, and the capacity for the enjoyment of life, as well as for a productive activity. In these cases, even more than in that of the artisan bound down to a one-sided bodily development, it becomes of the utmost importance to take care of the neglected body in order to rescue the entire man. Such a rescue, a recovery and preservation of all the powers of the human being, — this basis and condition of all health and of all power for activity, — can, however, be effected by **suitable exercises of the body**. As such there have been recommended, and often practised, walking, walking trips, mountain climbing,<sup>1</sup> horseback riding, chopping and sawing wood, and much else. But walking is one-sided only; and if it is to be reasonably effective, takes much time. This applies also to horseback riding. Walking trips, and journeys into the mountains, which are certainly very stimulating and refreshing in their effect, can be undertaken seldom, and then only for a short time. There then remains the practice of methodical gymnastics, a form of bodily exercise which is less expensive in time and money, which can be taken in any place, and which is preferable to all other forms in that it is free from all one-sidedness, and is capable of being adapted to the most varied conditions and circumstances; also because it can be controlled and measured exactly with regard to its effect.

As early as the Hellenic period of antiquity, and later, when the Middle Ages were in the height of their development and strength, methodical exercises were practised extensively, and with acknowledged success. In Greek gymnastics, running, jumping, wrestling, the discus and the spear, exercised in manifold forms, and methodically directed, were used in the education of youth as means to the development of a sound, powerful, and agile body. With older people these exercises were employed also with a view to preserving youthful vigor as long as possible. The ancient physicians, such as

<sup>1</sup> Recently, in cases of disturbance of the circulation, where it is connected with corpulence, according to the report of Oertel (cf. Oertel's *Therapie der Kreislaufstörungen*. Leipzig: 1885), mountain climbing has often been practised in so-called "terrain cures;" but its desirability has also been questioned by good authorities in just such cases, owing to the inability to control the amount of exertion, even where the roads have been measured in length and grade.

Hippocrates, Galen, Antyllus, had a full and clear comprehension of the dietary effect of their gymnastics in general, and of the special effect of the several exercises. Accordingly they recommended also, in certain conditions of ill health, — as, for instance, corpulence, — exercises with the ring, and the game with the heavy *korykos* (resembling a large ball) suspended from the ceiling of a room. Exercises in walking and running, as well as exercises for the voice (loud talking and singing) were used for the development and strengthening of the organs of respiration. The game with the little ball, because of the quick and ever-changing movements which it required, was used for general pleasant excitement of the organism, without fatiguing it, as well as for bodily dexterity, etc. When, in the Middle Ages, the study of the humanities was called into life again, and ancient languages, ancient art and science reappeared to the cultivated as so many shining stars after mind's long night, then ancient gymnastics also were dug up from the debris of antiquity, and, with new life infused into them, were used for educational, dietetic, and therapeutical purposes. In this way Hieronymus Mercurialis<sup>1</sup> wrote a voluminous learned work, adorned with many illustrations, appearing in its first edition in Venice, 1569, entitled "*De Arte Gymnastica*," which he himself describes as an "*opus non modo medicis, verum etiam omnibus antiquarum rerum cognoscendarum et valetudinis conservandae studiosis ad modum utile.*"

In most recent times there have been formed in all civilized countries associations and clubs (men's gymnastic clubs) which have had for their object the practice of properly regulated gymnastics. In the high and ordinary schools of both sexes also gymnastics have been introduced as a necessary element of instruction for the sound development of the young.

In all these cases the social manner of practising gymnastics was, and is, looked upon as important; and it cannot be denied that their practice, in company with other persons, produces good spirits,

<sup>1</sup> Hieronymus Mercurialis, born at Forlì in 1530, studied in Padua, Bologna, and Pisa. He was one of the greatest physicians of his time, and a prolific writer of medical works. The Emperor Maximilian II. was cured by him of a grave disease, and, in recompense therefor, gave him the title of "*Comes*" and "*Equus auralus*."



and affords, in many ways, a bodily and mental stimulus by which favorable conditions are established for the effect of the gymnastics, and, in consequence, the effect itself is heightened.

Circumstances often, however, do not permit the hard-worked artisan, merchant, official, or professional man to take part frequently in the gymnastic clubs (*Turnvereine*). Elderly, sickly, or weakly persons, or those too much accustomed to retirement, would refrain from entering into the loud merriment of younger or more vigorous men. Older women, again, have hardly any opportunity for practising methodical gymnastics in company. And yet, for the housewife and the mother, methodical bodily exercise, as a means of creating and preserving bodily health and strength, is absolutely necessary, acting as a counterpoise to the want of wholesome exercise incident to occupation with the affairs of life. Those children, also, who do not go to school have no opportunity for participating in the school gymnastics, and frequently are so situated that they cannot take part in any other gymnastics properly practised in company.

For all such cases gymnastics in the home, practised methodically, offer a substitute, the effect of which indeed is not as great as that of well-regulated gymnastics in company, but which is perfectly adapted for counteracting and removing the evil effects of a neglect of physical exercise.

The task now before us in this work is to teach and direct laymen in a comprehensive manner how to practise home gymnastics methodically.

## II. EFFECT OF BODILY EXERCISES.

The basis of the human body is a bony structure, which serves as a support for the softer parts, and also as a protection to the internal organs, by surrounding the cavities of the body (skull and chest) with firm walls. The bones form at the same time the levers by means of which the muscles exert their action, thereby producing the movements of the body. Around this bony structure lie the muscles,—that part of the mass of red tissue which consists of fibres of different sizes. The muscles are able, through the action of nerves, to contract their fibres and thus become shorter. Through this contraction the muscles pull on the bones to which they are

attached, thereby moving them and altering their relative position, the bones being movable at the joints where they are connected. Thus also the muscles are the important agents of locomotion.

The nourishment of all parts of the body is effected through the blood, which, driven by the pumping apparatus of the heart, courses through the whole body in membranous tubes (blood-vessels, or arteries and veins). On the one hand, by arteries, running from the heart, the blood flows to the various organs or parts of the body. By a process of exosmosis it oozes through the thin walls of the smallest branches of the vessels, to surrender its nourishing components to the surrounding tissue. In exchange there ooze in, by endosmosis, components which, by chemical action within the tissues, have been either changed or exhausted. This changed blood of the body, which by means of the chemical action inside the tissue has become poor in oxygen and rich in carbonic acid, then flows back to the heart through the veins (the general circulation). On the other hand, the blood also flows through arteries from the heart to the lungs. There through respiration a constant regeneration of the blood is produced, as fresh oxygen from outside is constantly brought to the blood, while at the same time the excess of carbon (in the form of carbonic acid breathed out) is removed from it. This blood, infused with new life by the oxygen taken up, and purified by the removal of carbonic acid, flows back to the heart from the lungs in veins (the pulmonary circulation) to enter afresh the general circulation from the heart.

The component parts of the blood which yield nourishment, viz., water, albumin, fibrin, fat, and salts, are the materials which serve to build up all tissues of the body. The last source of the unceasing renewal of the component parts of the blood is the activity of the organs of digestion. Through these the raw materials, introduced from outside as food, become so changed that they are assimilated and themselves grow into component parts of the body. These are taken by lymphatic vessels out of the organs of digestion and introduced into the stream of the great circulation.

Every living body is in a state of constant change in respect of its chemical components. In proportion to the greater or less activity of an organ, the chemical change becomes greater or less. The more active an organ is, the more rapidly the existing compo-

nents are used up, and the more rapidly renewal becomes necessary and takes place, if food and respiration furnish the adequate elements of new material. By this accelerated and increased outgo and income, the working power of the organ is developed in the most favorable manner.

Now as the muscles form the largest portion of the soft parts of the body, a more complete metamorphosis of their components and a more vigorous development of them must result from an energetic and methodically regulated activity of the whole muscular system. Each separate muscle becomes stronger; it derives from its contraction continuously increasing power and capacity for endurance; and its activity also becomes more precise and better controlled. And when a number of muscles are called into activity for combined and harmonious action, this result will be accomplished with greater perfection. The so-called power of coördination of the movements, firm carriage, dexterity, and grace of body will all increase.

At the same time such activity of the body produces in it a general favorable effect which is far-reaching. For, in proportion as the great mass of muscles called into vigorous activity absorb new blood for their nourishment, the circulation is accelerated, breathing and digestion are stimulated, and chemical change is quickened through the whole body. At the same time bodily warmth is thereby increased. Every one knows from his own experience that after active exercise the heart beats more rapidly and more vigorously; that the pulses are stronger, the chest breathes in fuller draughts; the cheeks redden, the inner warmth increases, and that finally a healthy and hearty appetite appears. If suitable nourishment is then taken, it will be proportionally well consumed and well appropriated by the organs stimulated. Thus a properly regulated activity of the whole muscular system improves the health of the whole organism. But improvement and a gradual cure will result more particularly in cases where abnormal conditions exist for the preparation of the blood. We refer here to anæmia, stagnations in the circulation, especially in the system of the portal veins (hemorrhoids), congestions of the liver, hardness of the abdominal region, disturbances of digestion, and many other troubles.

In this connection mention should be made of the fact that, aside



from the general effect which activity has on the muscles, the activity of single larger groups of muscles has the power of producing striking effects on single parts of the organism and its functions. Thus the muscles which surround and spread from the chest and are fastened at their ends to the arms coöperate with and improve respiration, if they themselves are strengthened; for their activity helps to enlarge the chest, and consequently increases inspiration proportionately. By their continued exercise, moreover, the improvement of respiration carries with it also an improvement in the formation of the blood, an increased change of tissue, and an accelerated removal of the effete matter — the wastes — of the body. In a similar manner the masses of the muscles which line the cavity of the abdomen in front and on both sides of the body promote, by their vigorous contraction, the movement of the contents of the intestines and the circulation of the blood in the vessels of the abdomen. A regular activity of these muscles is therefore unquestionably useful in most cases of chronic abdominal troubles.

Of all parts of the organism, the nervous system occupies the first rank. It incites and guides all the performances of the body and forms also the basis in which the mental activities are called into existence. The nervous system consists of the central parts, — that is, the brain, which lies in the skull, and the marrow, lying in the channel of the vertebral column; and of the peripheral parts, or nerves, which spread over the body as fibres or threads, and branch in and out like a tree. The central parts are the source of all the activities of the organism. The nerves are only organs of conveyance. Some of them receive impressions of the outer world and convey them to the central parts, thereby inducing counter effects. These are the sensory nerves, which receive the impressions by the aid of the organs of the senses, the eye, the ear, and the organs of smell, taste, and touch. Others again (the nerves of motion) are incited by the central parts to convey an impression to the several organs of the body, in order to incite the latter to definite activities.

Now, if a properly regulated activity of the muscular system increases the healthy condition of the whole organism, it follows, as a matter of course, that the nervous system which incites the organism to activity and regulates it must be favorably reacted upon;

for the nervous system then works, and is constantly regenerated, under conditions of the favorable nourishment of the whole organism of which it forms a part. A particularly pleasant consequence of this result of bodily exercise is a sound, quieting, and refreshing sleep, which in itself again has a very favorable influence on the entire physical and mental life of the person exercising.

Moreover, the nerves of motion, which bring about the contraction of the muscles through the incitement which they arouse, are directly strengthened in their functional powers by exercise of the muscular system. This is because the activity of a muscle, being definite in its effect and strictly controlled, as well as the coördinate movement of many muscles or groups of muscles, emanates after all from the incitement aroused in the nerves, which is also strictly controlled and held within exact bounds. So this kind of muscular exercise is in fact much more an exercise of the nerves than of the muscles. Improved activity of a portion of the nervous system has moreover indirectly a favorable effect on its other parts; for the influence of a muscle on its nerves of motion radiates in a favorable manner into the sphere of sensation of the nervous system. Thus nervous irritability and weakness are diminished or stopped.

A healthy nervous system is certainly a fertile soil for the growth of a normal mental and spiritual life; and while the use of gymnastics creates conditions which develop the nervous system, it has the power at the same time of exercising a wholesome effect on mind and spirit. And in many special cases of depression, hypochondria, and melancholia, it may effect a cure. Added to this is the fact that valuable psychical qualities, which have the power of producing a general wholesome effect on the mental life of man, are almost directly traceable to gymnastic activity. Thus, energy of will and perseverance, which at first asserted themselves only in the contraction of the muscles, are soon transferred to other activities of the will and eventually become traits of the man's character.

The power of attention and of quick volition, by means of which in composite movements the intricacies of many single movements are brought into a harmonious whole, develops eventually into a capacity of quickly grasping new situations, of quickly reacting on given incitements; in other words, alertness, determination, and presence of mind are developed.



## III. RULES FOR THE PRACTICE OF GYMNASTICS.

Home gymnastics are not meant to be used as a cure for serious diseases, certainly not without previous consultation with a physician. Therefore, strictly speaking, they are not "curative gymnastics." They are rather meant to be dietetic, to serve the purpose of preserving health and increasing strength. They may, however, be used with advantage in many kinds of troubles, as indicated in the Third Division of this book. But persons who have such troubles in an aggravated form should not neglect to obtain the advice of a physician before resorting to home gymnastics. For the reasons given we prefer for the home gymnastics the free movements of German gymnastics, which can be practised anywhere and without any preparation. We have also exercises with some implements easily procurable anywhere, such as wooden wands<sup>1</sup> and iron dumb-bells;<sup>2</sup> finally, exercises with the aid of a chair or a table, to be found in any dwelling. The effect of the free movements may be materially heightened if performed with dumb-bells. The exercises of home gymnastics can be performed by any intelligent person, without the aid or participation of any one else, by merely following this book. We have purposely excluded entirely the duplicated and resisting movements often so useful in cases of sickness, also the passive movements of Swedish curative gymnastics, as well as massage; because the exercises, if not performed correctly, either do no good, or do more harm than good; also because their correct performance requires the aid of an intelligent assistant who has been well

<sup>1</sup> The wands should be of a length corresponding to the height of the person exercising, and of a thickness of from  $\frac{3}{4}$  to  $1\frac{1}{8}$  inches (2 to 3 centimeters). Broomsticks, shade rollers, etc., may be used on occasion instead of the wands.

<sup>2</sup> Laymen are inclined to use too heavy dumb-bells. Children up to seven or eight years of age should exercise with dumb-bells only occasionally, and only in the especial cases mentioned in the Third Division of this book, and then the weight of each dumb-bell should not exceed  $2\frac{1}{4}$  pounds (1 kilogram). For girls and women, dumb-bells of the weight of  $2\frac{1}{4}$  to  $3\frac{1}{4}$  pounds ( $1\frac{1}{2}$  kilograms) suffices; for boys of twelve or thirteen years of age, those of from  $3\frac{1}{4}$  to  $4\frac{1}{2}$  pounds ( $1\frac{1}{2}$  to 2 kilograms); and for youths and men, such as weigh from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  pounds (2 to  $2\frac{1}{2}$  kilograms) are entirely sufficient. Uncommonly strong persons may use dumb-bells of about  $6\frac{1}{2}$  pounds (3 kilograms).

schooled in gymnastics.<sup>1</sup> It would not at all suffice that a relative or any other person happening to be available should assist, as neither, unless schooled for it, could prescribe intensity and rapidity requisite for the exercise. Well drilled assistants are not likely, however, to be at the command of more than a few persons desirous of using home gymnastics, and even untrained assistants, such as we have just referred to, are not available to many.

Home gymnastic exercises, if they are to be of decided benefit, must be performed **with absolute regularity**. They must be taken **daily**. The time for daily exercise by younger children and weakly persons should be about half an hour. Persons of greater vigor and training may extend it up to an hour. Weakly persons desirous of deriving as great a benefit as possible from home gymnastics might exercise twice a day for half an hour each time.

Home gymnastics should be continued with steady **perseverance** for a long time; the practice of them must grow, as it were, into a habit of life. Only then will a far-reaching effect be attained. Whoever, after a few weeks' practice, impatiently looks for striking results, is doomed to disappointment. As described in the Third Division, the exercises may be taken in a suitable variety by persons of every age and of either sex. But they must be omitted in acute febrile diseases; in cases where inflammatory conditions exist; also by women during pregnancy and during menstruation, if it be excessive or accompanied by difficulties.

The several movements should be carried out with **attention** and with **will power**, with muscles tense and exactly according to the form prescribed, in definite number each time. This number may be smaller, or greater, according to the strength of the individual, and should be determined in conformity therewith. In the Third Division of this book the limits of the repetitions are specially defined under the rules laid down for the exercises. After finishing the several movements belonging to a single group of exercises, a pause should be made for rest, during which there should be **quiet and deep breathing**. If by any exercise beating of the heart and

<sup>1</sup> The undersigned, having for a series of years been assistant in the Institution of Curative Gymnastics of Dr. Albert Neumann, also in the same capacity in the Eulenberg Institute at Berlin, has had frequent occasion for observing these facts. — DR. E. ANGERSTEIN.

respiration have been much quickened, then both should be entirely quieted before the next one is begun.

In the total effect of the daily exercises a moderate pleasant fatigue is aimed at, never lassitude or complete exhaustion. Each period of exercise should begin with movements which call for moderate exertion only. Afterwards the more vigorous should follow, and the gymnastics should close with gentle and quieting movements. Only by degrees should the exercises be extended to the more difficult ones; weak persons especially should pay attention to this. For older people, the more quiet movements are, as a rule, best. Young children should take the exercises in gentler, more rounded forms, with less energy and less stretching than vigorous youths and men, for whom these characteristics of the exercises are indispensable.

Any one experiencing **giddiness, pain in the chest, in the groin, or any other difficulty** from the exercises, should **omit** them and **consult a physician**. Slight pains of the muscles, which are likely to occur in the beginning with persons unused to the exercise, are of no consequence, and need cause no interruption. Persons who have **not been in the habit of taking exercise of any kind**, beyond perhaps an occasional walk, should be careful to begin the home gymnastics with moderation, only gradually extending their number and range. They should also pay particular attention to what has been stated already in regard to consulting a physician under certain circumstances.

It is desirable that the organs of digestion should be as empty as possible when the exercises are taken. **The hours of the day** for the gymnastics should therefore be so arranged as to **precede** any meal. The morning hours before breakfast are best adapted for them. Next to these the midday hour shortly before dinner. The time before supper will answer the purpose also. But in every case there should be a short interval between the exercise and the meal following it, and it should be long enough to allow the excitement produced by the exercise to disappear, and to restore quiet to the whole organism. Under certain circumstances the late evening hour also becomes available, especially in cases where better sleep is aimed at.<sup>1</sup> But in this case very exciting movements should be

<sup>1</sup> Cf. Tissot: *Medizinische und chirurgische Gymnastik. Aus dem Französischen.* Leipzig: 1782. Pp. 32, 33.

avoided, and a still longer interval should intervene between the time of exercising and that of going to sleep. Intestines and bladder should as far as possible be empty during the exercises, — a precaution to which special attention should be paid.

To take these exercises in the open air, when the weather is good, is of great advantage, because in fresh, pure air the power of respiration, stimulated by the exercises, has a largely increased beneficial effect on the health. In bad weather, especially when sharp east or north winds prevail, or in cases where a suitable place in the open air is not available, the exercises should be taken in a **very well ventilated room**, free from dust, and neither smoky, close, nor damp. The windows of the room might remain open during the exercises, even in the severest weather, if there is no strong draught, and if the necessary precautions are taken.

The **dress** of the gymnast should be **comfortable**, leaving all movements of the body unimpeded. Every tightness, especially around the neck, the chest, and the abdomen, caused by an inappropriate dress, has a positively injurious effect in gymnastics. Females should avoid especially corsets and petticoats that are tied tightly over the hips, also tight inelastic garters; males should discard tight cravats or neckerchiefs and tight belts or straps for holding up the trousers.



## SECOND DIVISION.

### GYMNASTIC EXERCISES AT HOME.

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#### PRELIMINARY REMARKS.

THE position to be taken in beginning the exercises we call **Position at the Start**. In it the heels are put together, the toes pointed outward in such a manner that the feet are about at right angles, the legs rigid, trunk and head kept erect and shoulders somewhat back, so that the chest shall expand freely. The arms hang easily at the side of the body, the fingers slightly bent, the thumbs in front (cf. Fig. 12).

In another position, which we call the **Feet Touching Position**, the weight rests on the heels, and the feet are turned inward till their inner lines meet, the toes being slightly raised.

**Pace Position** is that illustrated in Figs. 6 and 27. In it one foot is placed either forward, backward, diagonally forward, diagonally backward, or sideways.

The **Straddling Position** is that in which the right leg takes a lateral step to the right, and then the left leg a lateral step to the left (cf. Fig. 24).

In many exercises it is desirable to **rest the hands on the hips** in such a manner as to keep the thumbs behind the rest of the fingers in front and closed, the inner surface of the hands lying close against the body, while the elbows correspond with the direction of the shoulders (cf. Figs. 24 and 25).



## I. MOVEMENTS OF THE HEAD.

## EXERCISES FOR THE NECK.

All movements should be made quietly and uniformly, without jerking.

## 1. Head Torsion.

In an erect position the head is turned alternately to the right and to the left, consequently around the axis of its length, so that one looks over the right and then over the left shoulder (Fig. 1).

Any movement of the shoulders while turning the head is to be strictly avoided.



Fig. 1.

## 2. Head Bending.

## a. Forward and backward.

The head is bent forward and if possible so far that the chin touches the chest lightly, without the least twist, and in a regular, steady movement in which there must be no jerking.

After remaining a short time in this bent position, the head is raised till it is again erect.

The backward bending is done in a corresponding manner. The upper part of the body, and especially the shoulders, should be kept quiet and entirely passive.

## b. Left and right sideways.

The head is bent exactly in the directions indicated, without the least twist, and without any lifting of the shoulder on one side, or lowering on the other (Fig. 2).



Fig. 2.

## 3. Head Rotation.

The head is first bent forward, then turned sideways to the left, then backward, then sideways to the right, and again forward; or

in the opposite sequence. The movement is a continuous one, and must be made in a regular and steady manner. The face retains its direction towards the front, upwards, etc.

By the movements of the head the muscles of the throat and neck are exercised and invigorated. These movements are therefore appropriate in cases of paralysis<sup>1</sup> and weakness of these muscles; also for remedying habitually wrong positions of the head, especially for holding the head on one side. In these latter cases bending movements towards the opposite side only should be used. The movements of the head also render the joints of the vertebræ of the neck more supple.

## II. EXERCISES FOR THE TRUNK.

All movements of the trunk are to be made slowly and evenly.



Fig. 3.

### 4. Trunk Torsion.

In the position for this the feet touch, the hands are placed on the hips, or held horizontally with arms outstretched.

The upper part of the body is twisted alternately to the left and to the right as far as possible around the vertical axis; the head follows the movement, without, however, twisting it independently. The feet remain firmly planted with the whole of the soles on the floor, and the legs remain rigid (Fig. 3).

This movement affects the side muscles of the abdomen and the muscles of the hips, and produces in them an invigoration which is useful in cases of their weakness or paralysis.

It also promotes the circulation in the vessels and activity in the

<sup>1</sup> By **paralysis of motion** those conditions are meant in which the capacity for exciting the voluntary muscles through the influence of the will has disappeared or become weakened.

Paralysis may be **complete** (total paralysis) or **incomplete** (partial paralysis). In the latter a limited use of the members affected is still possible. **Active gymnastics can become of use only in partial paralysis.** In total paralysis they cannot be applied.

organs of the abdomen, by means of the varied tension of the abdominal walls and the coincident change in the relative position of the intestines.

### 5. Trunk Bending forward and backward.

The hands are placed on the hips, with the legs perfectly rigid. First the head is bent forward and backward, then the trunk is moved quietly and evenly in the same directions, so that the whole vertebral column participates in the action, with the angle formed at the hip joint (Fig. 4).



Fig. 4.

The shoulders should not be moved out of their position; the backward movement must not be exaggerated, nor the backward bend be long maintained.

The stretching should also be done slowly.

The forward bend is produced by the muscles of the abdomen (especially the straight abdominal muscles) and the muscles lying in the pelvis (those of the loins and that attached to the inner side of the hip bone). The backward bend is produced through the extensor muscles of the back and the muscles of the vessels.

The forward and backward bends, especially when done alternately, promote the movements of the secretions in the vessels of the abdomen, as well as the movements of the contents of the bowels. The exercise is, therefore, useful in cases of **stagnation in**

the vessels of the abdomen (hemorrhoids), or of sluggishness in the evacuations of the bowels.

The backward bend in itself invigorates the dorsal muscles, and should be practised in cases of weakness and paralysis.

## 6. Trunk Bending sideways.

The hands rest on the hips. The head is bent sideways to the right and to the left; then the trunk follows in the same direction as far as possible without lifting the opposite foot (Fig. 5). Twisting the head and change in the relative position of the shoulders or of the hips must be avoided.



Fig. 5.

This exercise is accomplished through the side and back muscles of the abdomen, the dorsal muscles, the intercostal muscles, and the muscles of the lower ribs. It promotes the activity of the internal organs of the abdomen, especially of the liver, which is on the right, and of the spleen, which is on the left, of the cavity of the abdomen, just below the diaphragm. The exercise further acts favorably in cases of stagnation in the vessels of the abdomen, and may be used with success in cases of

lateral curvature of the spine. In the latter cases the bending must be to one side only, toward the convexity of the curvature.

## 7. Trunk Bending from a Position of Tor-sion.

After taking the Position at Start, advance either foot one pace diagonally, in the direction in which that foot points; then turn the trunk to the left or right.

Next follows a bending of the trunk forward and backward in the direction of the foot put forward (Fig. 6). The legs remain rigid.



Fig. 6.



The bending of the trunk from the Position of Torsion may also be done in the Position at Start.

This exercise has a heightened effect similar to that in which the trunk is bent forward and backward without torsion from the Position at Start (Exercise 5). Its effects also resemble those of the exercise in which the trunk is twisted (Exercise 4).

### **8. Trunk Rotation.**

The trunk is bent forward, and then, without straightening it again, sideways to the left, then backward, then sideways to the right, or in reverse order, and with a quiet movement, then again forward, and so on.

In this manner the longitudinal axis of the trunk describes the surface of a cone, the apex of which is at the lower part of the vertebral column.

Not till the end of the exercise does the trunk again return to an erect position. Turning the trunk in any way around the longitudinal axis should be avoided.

In Trunk Rotation numerous muscles (all the muscles of the bowels and many of the back and hips) are successively in play. As compared with Trunk Torsion (Exercise 4) this exercise produces a more effectual tension and stretching of the walls of the abdomen, because it accomplishes a more thorough change; and for that reason it produces a more efficient moving about of the intestines. The exercise vigorously excites the activity of all abdominal organs, and is extremely useful in cases of **stagnation in the vessels of the abdomen, and constipation**. In the latter, it may have an immediate effect if the rotation, and with it the pressure on the intestines, takes place in only **one** direction (*viz.*, forward, to the right, backward, to the left, and so on), following the course of the large intestine, and in such a manner as to correspond with the continuous forwarding of its contents; if, moreover, the transitions from the forward movement to the right and from the backward movement to the left are made in a particularly vigorous manner.

This exercise is useful also in cases of **weakness and paralysis** of the special muscles which come into play.



### III. EXERCISES FOR THE ARMS AND HANDS.

With the exception of the exercises for the shoulders and those for the fingers, the exercises for the arms as indicated in some figures may be performed also with **dumb-bells**.

The following terms apply to the various positions described below :—

**Spoke Position** (of both arms and hands). In this the arms are held horizontally forward and stretched, with the thumbs uppermost.

**Ell Position.** In this the arm is turned so as to bring the little finger upward.

**Raised Position.** This brings the back of the hand upward.

**Ridge Position.** This brings the inner surface of the hand upward.

The same terms are also used for the positions of the arms and hands when, **without any further turning**, in the positions above described, the arms are either raised or lowered. Accordingly, in **Spoke Position**, when the arms are raised to the vertical, the thumb is put towards the **back**, and when the arms are dropped by the side it is towards the **front**, and so on.<sup>1</sup>

#### 9. Shoulder Raising.

With arms dropped by the side, the shoulders are raised slowly but strongly as high as possible and lowered slowly.

This may be done either with both shoulders simultaneously, or with the left and right shoulders alternately.

The movement is produced by the muscles which raise the shoulders ; but it also causes the upper ribs to be lifted so that the upper portion of the cavity of the chest is enlarged. Therefore this movement is useful for promoting **activity of respiration in the apices of the lungs**, which generally become diseased first in cases of incipient tubercles in the lungs (catarrh of the apices of the lungs). It is also effectual in cases of **weakness and paralysis of the lifting muscles of the shoulders**.

In cases of so-called **high shoulder**, consequent upon paralysis of

<sup>1</sup> In each of the subsequent exercises in which the position of the hand is of importance, this position is again described.

one side or lateral curvature of the spine, the exercise should be taken only on **one side** and with the lower shoulder.

### 10. Shoulder Movement forward and backward.

The hands rest on the hips. Both shoulders are first moved forward evenly and then drawn backward vigorously. The elbows, simultaneously with the shoulders, are moved forward and backward as far as possible.

The upper part of the body and the head must not lose their upright position. Simultaneously with the backward movement of the shoulders there should be inspiration, and with the forward movement, expiration.

The backward movement is the more important part of this exercise.<sup>1</sup> It is done by means of the back muscles of the shoulders and by some dorsal muscles (the rhomboidal muscles), and these it strengthens. For this reason it is of great use in cases of their **weakness** or **paralysis**, which are indicated by a stooping carriage, bent back, and protruding shoulder blades. Moreover, the **chest is expanded** and **respiration is stimulated** by the action of drawing the shoulders back. Therefore the exercise may be recommended in cases of **difficulties in breathing** (asthma).

### 11. Arm Raising sideways.

The arms stretched at full length are raised laterally from the side, quietly and steadily, till they reach a vertical position (Fig. 7). The fingers are together and stretched; the back of the hands during the first part of the movement, while the arms are

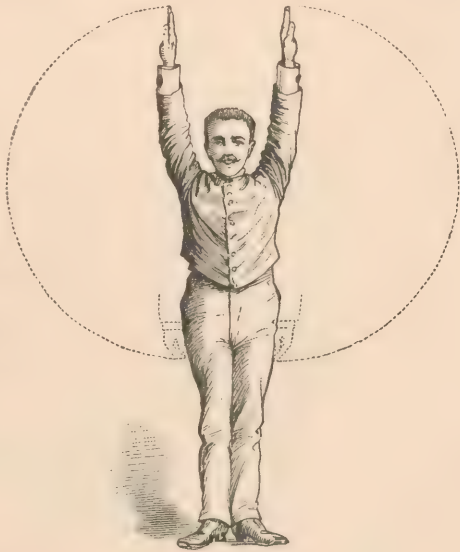


Fig. 7.

<sup>1</sup> The backward movement is more effectual if it follows the forward movement, and is not taken, as to the shoulders, from the Position at Start.

hanging down, are first turned outward; then upward, while the arms are level; and finally inward (toward each other), after the arms have been lifted to their full height. Then the arms are lowered sideways, which must be done slowly and with tense muscles.

The movement is produced by the muscles of the shoulder and the dorsal muscles. The deltoid muscles, covering the shoulders, are specially active in it. The exercise causes an **expansion of the chest** and stimulates **respiration**. It is therefore especially to be recommended in **asthmatic troubles**, as well as in cases of **defective development of the chest** and the **organs of respiration** (weak chest).

## 12. Arm Raising forward.

The arms are raised forward slowly and evenly, first to a horizontal and then to a vertical position, and are then lowered again. The inner surfaces of the hands are turned towards each other.

The exercise is performed by the lifting muscles of the arm, and invigorates the muscles in play. It also **enlarges the chest**, especially in its upper part. It can be applied, therefore, in cases similar to those named in the previous exercise.

## 13. Arm Swinging sideways.

This corresponds with Exercise No. 11, but it must be taken rapidly and with vigor. When the vertical position is reached, the arms retain it for a moment; then they are swung sideways and downward.

The effect of this exercise is similar to that of Arm Raising sideways (Exercise 11), but the effect of the latter is somewhat milder.



Fig. 8.

## 14. Arm Swinging backward and forward.

The hands are closed into fists; the arms are swung forward into a horizontal position, and then back as far as possible without moving the trunk forward (Fig. 8).

This movement is produced by means of the muscles of the shoulders, arms, chest, and back. It has a generally stimulating effect, quickens the circulation, and strongly stimulates respiration; it therefore warms and animates the body. In cases of nervous troubles, especially in the abdominal organs, its effect is useful.

### 15. Arm Spreading.

First raise the arms forward into a horizontal position. Starting from this, the arms are moved outward and backward, then again forward, **without being lowered**, till the original position is again reached, or till the hands touch, or till the outstretched arms are crossed.

This exercise must be taken slowly and evenly by weak-chested persons, and by strong persons rapidly and vigorously.

The spread of the arms is produced by the dorsal muscles; the forward movement, by those of the chest. The exercise enlarges the chest and invigorates the muscles surrounding it. Therefore it can be highly recommended as a means of promoting activity of respiration, in the cases named in Exercises 10 and 11, also as a means for the improvement of a faulty formation of the chest (chicken breast).

### 16. Arm Rotation.

The arms are raised sideways. The tips of the fingers then, by a moderately rapid motion, describe a circle, the central point of which is even with the height of the shoulders. The arms thus describe the surface of a cone, the apex of which is in the joint of the shoulder. The backs of the hands remain turned upward (Fig. 9).



Fig. 9.

Care should be taken that the circle be complete in the backward motion.



The rotation should begin sometimes backward (**circle backward**) and as often forward (**circle forward**).

### 17. The Mill.

The Mill, or Arm Rotation in large circles, is performed in a continuous motion, backward as well as forward.

*a.* With both arms simultaneously.

*b.* With one arm.

The Mill backward with both arms (Figs. 10 and 11) begins with



Fig. 10.



Fig. 11.

arms hanging down and extended; they are then raised forward till they reach a vertical position. During this action the rims of the thumbs are first pointed upwards. When they have reached the position *b* (cf. Fig. 10) the hands are turned so as to cause the little fingers to point backward. Then the arms are lowered backward in as large circles as possible. At *c* (Fig. 10), the backs of the hands are upward (cf. also Fig. 11), and as soon as the arms have again reached *a*, they are again pointed outward as in the beginning.

In the Mill forward the arms are first raised backward; then follows the rotation in a corresponding manner.

The Mill backward and forward with one arm is performed with the same turns of the hand as the Mill with both arms.

Arm Rotation in small circles as well as in large is produced by a large number of muscles of the shoulder, the chest, and the back, and puts these into great activity. The rotation in small circles is the easier exercise of the two, and has a milder effect; it may be performed as an introduction to the Mill and as an exercise preparatory for it. Both exercises, especially the Mill, bring about freedom of motion in the joints of the shoulders, an invigoration of the muscles surrounding the chest, an expansion of the chest, and an improvement in the activity of respiration. The Mill with one arm is easier to do than that with both; the former primarily brings about a freedom of motion in the shoulder-joints while the latter has a marked influence on expansion of the chest, and much invigorates the movements pertaining to respiration.

Arm Rotation, especially in large circles, is therefore of great benefit in diseases of the organs of respiration (asthma and incipient tubercles), also in cases of relaxed and bent carriage, of faulty formation of the chest, and of lateral curvature of the spine.

### 18. Arm Bending and Stretching.

The forearms are drawn toward the upper arms, which remain in their vertical position; the hands bend in the same direction, so that the tips of the fingers touch the shoulders in front.

From this bent position the arms are vigorously stretched upward, forward, sideways, backward, and downward (Fig. 12). The fingers remain together and extended; the hands are in the same position as the arms.

In the lateral stretch the inner surfaces of the hands

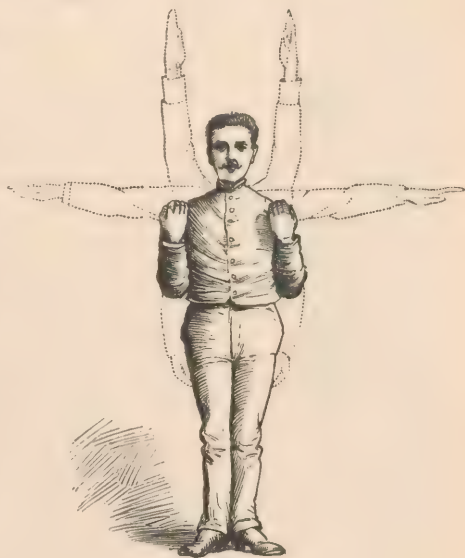


Fig. 12.

are downwards; in the upward, forward, and backward stretches, the surfaces of the hand are turned towards each other, and kept as far apart as the shoulders are.

In the backward stretch no bending of the trunk must take place.

These exercises may also be taken with either arm alone; again, alternately, and in such a way that one arm passes into the bent position, while the other is being extended; and, finally, **simultaneously in different directions**. Thus, for instance, one arm is stretched upward while the other is stretched sideways, or one arm is stretched forward while the other is stretched backward. In the latter case, care will have to be taken that there be no torsion of the trunk, and no displacement of the shoulders.

The bending and stretching movements of the arm have an invigorating effect on almost all the muscles of the arm, and on those muscles which start from the trunk and are attached to the arm. They render the shoulder and elbow joints limber, and promote respiration. If the movement is carried out with the energy and precision of muscular impulse which a correct performance of the exercise demands, it also stimulates the development of a strong and active will-power, and results in an increased

control of the movements of the body generally. Finally, it produces a general excitement of the organism.

### 19. Arm Stretching backward and downward.

The hands are first folded on the back, with their inner surfaces backwards (Fig. 13). Then the arms are stretched downward, slowly, but vigorously, and in so do-



Fig. 13.



Fig. 14.

ing the shoulders are drawn downward and backward (Fig. 14).

In the process of stretching the arms, the inner surfaces of the hands finally touch each other, and at the same time the breath should be expelled.

The muscular activity induced by this exercise and its other effects are similar to those referred to in Exercise 10 (Shoulder Forward and Back). The exercise is, therefore, highly to be recommended in cases of **crooked back**, **protruding shoulder-blades**, or **relaxed carriage**, and for promoting activity of respiration (in asthma). In cases of lateral curvature of the spine it is also useful.

## 20. Arm Thrusting.

Preparatory to the thrust, the forearms are lifted to a horizontal position, and the elbows are drawn so far back that the wrists come into line with the surface of the chest (compare Fig. 50). The hands are closed into fists. The shoulders should not be lifted.

In this position the fists are thrust forward, sideways, upward, or downward, in a **straight line**, by stretching the arms quickly and vigorously, in a similar manner to that shown in Fig. 18.

The fists should be bent **outward** in the lateral thrust, and **upward** in the upward thrust. In both cases this should be done just before giving the actual thrust.

In order to do the thrusting **downward** very energetically, the elbows should first be lifted upward (Fig. 15); then the thrust follows.



Fig. 15.



Fig. 16.

Arm Thrusting, like Arm Stretching (Exercise 18), may also be done with **one arm alone**, or with both arms alternately (Fig. 16) or **simultaneously**, and in various directions.

The alternate thrusting downward, with trunk bent forward and legs spread laterally (straddling), is called **Stamping**.

The effect of Arm Thrusting is much the same as that of Arm



Bending and Stretching. As regards the **general excitement of the organism**, its effect is, however, greater than that obtained by the other exercise, because of the concussion of the body incident to the thrust. Stamping, moreover, promotes, in an excellent manner, the **activity of the abdominal organs**.

## 21. Hand Friction.

The arms should be raised in front, and the surfaces of the hands pressed against each other. Then they are rubbed together, while first one arm, then the other, is slightly bent and straightened alternately.

The exercise affects nearly all the muscles of the arm, especially its bending muscles. Its action excites the organism generally, **warms the hands**, and removes any **excess of blood in the head and chest**.

## 22. Beating with the Forearm in Raised Position.

The arms are raised sideways into a horizontal position (the backs of the hands upwards, therefore in the Raised Position), the forearms being bent forward till the ends of the fingers touch (Fig. 17). Then the arms are moved backward, on a level with each other, to a horizontal position. This should be done at full stretch, and as far backward as possible, either slowly or with a swinging motion.



Fig. 17.

This exercise may be performed with **both arms simultaneously** (Fig. 17), or **alternately** (Fig. 18); also with hands closed into fists.

Besides the bending and stretching muscles of the arms, these

exercises bring into activity the front muscles of the chest, the back muscles of the shoulders, and some dorsal muscles attached to the shoulder blade. They render the elbow-joints limber, and their effect corresponds in other respects with the general results of Arm Spreading. The action of the simultaneous beating with the forearm produces an expansion of the chest which results especially in an improvement of any defects of its formation, and in an increased activity of respiration.



Fig. 18.

### 23. Beating with the Forearm in Ridge Position.

This resembles the previous exercise, but the arms, which are lifted sideways, are turned so as to bring the inner surfaces of the hands upward (Ridge Position). Together with the forearms, the hands and fingers are bent till the ends of the fingers touch the shoulders.



Fig. 19.

The forearms are swung in a vertical plane, parallel with each other, while the upper arms retain their horizontal position.

This exercise also is performed with both arms, either simultaneously or alternately (Fig. 19), and also with the closed fist.

Its action is invigorating to the muscles of the arms, especially to their stretching muscles, and limbers the elbow-joints. The general effect is the same as that of Arm Bending and Stretching.

## 24. Hashing Movement.

The forearms are raised forward into a horizontal position, with the hands closed into fists, and the sides of the thumbs directed upward.

In this position the forearms are swung vigorously upward and downward, but not with full bending or stretching of the arms.

The movement reminds one of the hashing of meat. It may be done **simultaneously with both arms**, or **alternately**; that is, in such a manner that either both the forearms are lifted simultaneously above the horizontal position and then lowered simultaneously, or that one arm is lifted, while the other is lowered.

The action of this exercise is invigorating to the **bending and stretching muscles of the arm**, and strongly **excites the organism in general**.

## 25. Chopping Movement.

Beginning with outstretched arms, the **fists** are placed near the shoulder in every one of the various strokes; then the stroke is given by a vigorous stretch of the arm while the fist leaves the shoulder in a **circular line**. The middle knuckles move in the direction of the plane of the stroke.

### *a.* Spoke Stroke.

The right fist is at first raised over the right shoulder (near the right ear), with thumb directed backward. The elbow is raised forward. Then the stroke is given forward and downward. The arm when it reaches the horizontal direction is already fully extended, and in that position it is then swung backward close by the upper part of the thigh.

### *b.* Raised Stroke.<sup>1</sup>

The right fist is raised over the left shoulder (near the left ear), and the stroke is given diagonally downward towards the right side. The backs of the hands remain upward.

<sup>1</sup> Technically called **High Raised Stroke**, in contradistinction from the **Horizontal Raised Stroke**, executed at shoulder height, and from the **Deep Raised Stroke**, which is given diagonally from below upward.

### c. Ridge Stroke.<sup>1</sup>

The right fist, as in the Spoke Stroke, is lifted over the right shoulder, but the back of the hand is pointed backward; the elbow is pointed outward and somewhat backward. The stroke is given diagonally downward, and ends above the left hip.

In a similar manner these strokes are given with the left arm.

The effect of the Chopping Movement is like that of Arm Bending and Stretching as well as that of Arm Thrusting. In energy it equals the latter.

## 26. Hand Bending and Stretching.

The arms fully extended are lifted sideways or forward, the backs of the hands being turned upward. In this position the following exercises are taken:

### a. Hand bending upward and downward.

The hands, with fingers extended and together, or clenched, or weighted with dumb-bells (Fig. 20) are bent upward as far as possible in the direction of the backs of the hands; then they are extended in the original position; then bent downwards, and so on.



Fig. 20.

### b. Hand bending sideways.

The bending is alternately toward the thumb side and toward the little finger side.

A quick bending movement of the hands this way and that, in fact, becomes a **swinging of the hands** upward, downward, or sideways.

## 27. Hand Rotation.

The arm is held as in the previous exercise.

In the rotation the hand describes the surface of a cone, the apex

<sup>1</sup> Technically called **High Raised Stroke**.



of which lies in the wrist. In this manner, with an even and constant movement, the action passes, for instance, from the Bending Position upwards into the Bending Position sideways, downwards, sideways in the opposite direction, and so on.

Hand Bending and Stretching, as well as Hand Rotation, develop the muscular system of the forearm, and render the wrist supple. These exercises can be successfully applied in cases of **writer's cramp**, and are beneficial in **St. Vitus-like twitchings**.

### **28. Finger Bending and Stretching.**

The fingers are slowly but vigorously bent enough to form a fist, and are then again opened forcibly.

### **29. Finger Spreading.**

The spread consists in holding the tips of the fingers apart from each other and in the plane of the surface of the hand.

After the spread the extended fingers are brought together again, or are tightly clenched, this latter action increasing in some cases the effect of the exercise.

The finger exercises indicated are produced partly by the muscles of the forearm which bend and stretch the fingers, and partly by the muscles of the hand. They exercise these muscles, and are especially useful in cases of **writer's cramp**; also in **twitchings** of the nature of **St. Vitus' dance**. After a fatiguing use of the hands in writing, drawing, sewing, etc., they rapidly refresh and reinvigorate the muscles.

## **IV. EXERCISES FOR THE LEGS AND FEET.**

### **30. Leg Raising.**

It may be done as follows :

- a.* Sideways (Fig. 21).
- b.* Forward and backward (cf. Fig. 22).
- c.* Diagonally forward and diagonally backward.

From the Position at Start, but with hands resting on the hips, either leg, which must be fully extended, is raised exactly in each of the directions named, as far as possible, and without bending the

body, which must be kept erect. After remaining a little while in this raised position, the leg is lowered again slowly.

The toe, in this exercise, is pointed downward and a little outward. The supporting leg should remain perfectly rigid and should not be bent.<sup>1</sup>

### 31. Leg Spreading.

Leg Spreading and Leg Closing differ from the preceding exercise only in that the upward and the downward movement of the leg is taken with a swing. Particular care must be taken that in this as well as in the following exercise the supporting leg be kept rigid.



Fig. 21.



Fig. 22.

### 32. Leg Swinging.

#### a. Forward and backward (Fig. 22).

Either leg is swung energetically forward, and past the other leg, and then backward with equal force.

The toes are pointed downward and a little outward. They are raised slightly, but only at that moment when the moving leg is in the vertical position.

<sup>1</sup> If Leg Raising is done while standing, only one leg can be raised. In doing this the leg which is raised leaves a certain distance between it and the other leg, on which account this exercise may also be termed **Leg Spreading**. The raising or spreading may be as at first (without swing) or rapid (with swing). Generally, however, the term "Leg Raising" is understood to designate the slow movement without swing, while "Leg Spreading" is understood to mean a rapid swinging motion. In a position in which the legs do not support the body, as, for instance, in sitting, lying, or hanging by the arms, both legs may be raised simultaneously.

*b. Outward and inward (Fig. 23).*

Either leg is raised forward a little, then swung first to the left or right laterally **outward**, and then, by means of a gentle torsion of the upper part of the body, swung to the right or left laterally **inward**, thus crossing in front the supporting leg.



Fig. 23.

Those who find difficulty in maintaining the equilibrium of the body while the leg is swung may, in the beginning, rest the hand on the back of a chair, or on a table; but the exercise is of greater value when performed without any support.

The movement is more difficult when the leg is swung in a curve over the back of a chair.

### 33. Leg Rotation.

Either leg is lifted forward, and then the foot is turned with an even motion outward, and therefore to the right or to the left, then backward and inward past the supporting leg, and again to its front; or the exercise may begin backward, and be then continued outward, to the front, inward, and so on. The moving leg thus describes the surface of a cone, the apex of which lies in the hip joint.

The exercises of Leg Raising (Exercise 30), Leg Spreading (Exercise 31), Leg Swinging (Exercise 32), and Leg Rotation (Exercise 33), are performed by the aid of numerous muscles which lead from the pelvis to the upper thigh. They have an invigorating effect on these muscles, render the hip joint more supple, remove excess of blood from the head and chest, and promote the activity of the organs of the abdomen, in cases of stagnation. In the last respect Leg Swinging is specially effectual, and it also contributes much to the general invigoration of the organism.

### 34. Leg Torsion.

Beginning with the Position at Start, first the heels, then the toes, are turned outward (by a slight simultaneous raising of the heels or of the toes and balls of the feet), and so on alternately. In this manner a Straddling Position is reached (Fig. 24).

From this Straddling Position the Position at Start is recovered by means of adequate torsion of the legs alternately on the heels and on the toes and balls of the feet.

### 35. Drawing the Legs together.

This is done :—

*a.* From the Straddling Position on the toes and balls of the feet (Toe Position), by drawing the legs together by short jerks alternating from the right to the left. The legs should be kept perfectly tense.

The toes and balls of the feet must not leave the floor, but should slide along over it.

*b.* By a movement which draws the legs together **simultaneously** and evenly and with the entire soles of the feet on the floor.

Exercise *b* is difficult, and is accomplished successfully only on a smooth floor. It is much facilitated by leaning with the hands more or less heavily on a table or anything similar.

Exercises 34 and 35 are performed by means of muscles which lead from the pelvis to the upper thigh. The contraction of the legs is accomplished mostly by the muscles lying on the inner part of the thigh, called the adductors; but the muscles of the calf also participate in the action. Exercise 34 causes a **mild general stimulation**. Exercise 35 **strengthens the muscles called into action**, and is therefore useful in cases of their **weakness or paralysis**. It can also be used with advantage in cases of **stagnation of the organs of the abdomen**.



Fig. 24.



### 36. Little Knee Bend.

The Little or Half Knee Bend begins with the Position at Start, except that the hands should be placed on the hips. The upper portion of the body retains unchanged its vertical position. Both knees are then bent quietly and evenly in the direction of the feet, together with a simultaneous and gradual raising of the heels into a position which rests the body on the toes (Fig. 25), till the thigh and leg form a right angle.



Fig. 25.

After staying a short time in this position the knees are straightened and the heels lowered gently.

A bending and straightening of the knee, one movement immediately following the other, is called **Knee Balancing**.

Instead of placing the hands on the hips, the arms may be raised to a horizontal position, either forward or sideways, or up to a vertical position; or an Arm Raising Position may be taken combined with Knee Bending.

If the exercise is taken in the position called Feet Touching, the knees when close together are also bent forward in the direction of the feet.

### 37. Deep Knee Bend.

The Deep Knee Bend (Fig. 26) is similar to the preceding one, but the bend should be as low as possible, till the seat almost touches the heels.

The upper part of the body should not incline towards the front, but on the contrary should be held in the vertical position from beginning to end. The small of the back is drawn in; the heels are raised as high as possible, and must remain together.



Fig. 26.

### 38. Alternate Knee Bend.

#### a. In a Pace Position forward (Fig. 27).

Beginning with the Position at Start, the right foot is put forward about twenty-four inches either directly or diagonally, taking a Pace Position on the right; then the left or hindmost knee is bent. The weight of the body rests on the hindmost foot; the forward leg remains entirely rigid, and the trunk remains vertical.

Then the left knee is straightened with a forward inclination of the body, and the right or forward knee is bent. The weight of the body now rests on the forward foot, the heel of which may also be raised. The trunk and the hindmost leg are now in the same line.

In a similar manner a Pace Position on the left is then taken.



Fig. 27.

#### b. In a Straddling Position.

From the Position at Start, by placing the right and the left foot sideways, the Straddling Position is reached (cf. Fig. 24).

Now the left leg is bent, while the right leg remains rigid; then *vice versa*. The upper part of the body follows the movement by a lateral turn of the pelvis (the hips), but without leaving the vertical position. The weight of the body therefore rests on the bent leg.

In the various forms of Knee Bending and Stretching, the bending muscles, but chiefly the stretching muscles of the legs, are called into activity. Exercises 36 and 37, chiefly the latter, also affect largely the dorsal muscles. All these exercises have for these reasons a beneficial effect in cases of **weakness or paralysis of the lower limbs**. Exercises 36 and 37 also have such an effect in cases of **weakness or paralysis of the dorsal muscles**, bad carriage, or deformities of the spine.

### 39. Knee Raising forward, and Leg Stretching.

The knee is raised so high that the thigh is at least in a horizontal

position, while the trunk is held upright. The lower leg hangs vertically down, with the foot bent slightly upward (Fig. 28).



Fig. 28.

In this position the whole leg is quietly but vigorously extended, and with it the foot also. The thigh should not be lowered enough to make the full extension of the leg impossible. The supporting leg should continue rigid during the exercise.

The act of raising the thigh is exciting to the circulation of the blood in the organs of the cavity of the pelvis, and to the peristaltic action of the lower parts of the intestines. This part of the exercise is therefore useful in cases of **hemorrhoids** or of **hardness of the abdomen**. The entire movement calls into activity numerous stretching and bending

muscles of the legs, and may for this reason be recommended also for the **invigoration of the muscles of the legs**; finally, it serves to render the joints of the **knee** and of the **hip** more supple.

#### 40. Raising the Lower Leg.

The left or right lower leg is raised backward by a movement of the knee-joint (Fig. 29), and lowered again by straightening the leg either slowly or with a swing. In the latter case the raising should, if possible, be carried so far that the whole heel shall touch the seat.

The thigh of the bent leg should maintain a vertical position close to the supporting leg. In other words, the knee should not be bent forward.

This exercise renders the extensor and flexor muscles of the lower leg active, and **the knee-joint** supple.



Fig. 29.

#### 41. Standing on the Toes.

Starting from a Standing Position in which the body rests on

the full soles (Sole Position) the Toe Position is taken, and then the heels—and along with them the whole body—are lifted. The body consequently rests on the toes and the balls of the feet only (Fig. 30). The heels should be lifted as high as possible; the body should be kept rigid and still.

The Toe Position may be practised by beginning either with the Position at Start or that called Feet Touching, or with the Straddling Position, etc.

A movement by which the body is lifted and lowered, in uninterrupted alternation, by means of a change from the Toe Position to the Sole Position, is called **Foot Balancing**.

It is advisable to put a light but not close-fitting cushion on the head (cf. Fig. 30), in order to acquire the habit of keeping the body quiet and steady both in this exercise and in all those in which the body rests on a small surface only,—including therefore those in which one leg only supports the body.

This exercise invigorates the muscles of the calf and of the feet, and strengthens those dorsal muscles which keep the trunk and the head erect. It should therefore be practised,—especially with some light object laid on the head,—for the purpose of acquiring a good carriage, and also in cases of deformities of the spinal column.<sup>1</sup>



Fig. 30.

<sup>1</sup> As early as 1782, Tissot mentions, among other means for producing a good carriage of the body, a light object carried on the head. He says: "In a nunnery, I have seen still another expedient resorted to among the boarders for improving a bent carriage of the head. The lady superior made them play all manner of games, and without allowing her motive to be perceived, she proposed one in which a round ball or anything else which would slip off easily was carried on the head. The object of the game was, not to allow the ball to drop while marching, and as is customary in other games a forfeit was paid by any young lady who allowed it to fall. I have been assured that this expedient has invariably been successful, because the children have accustomed themselves eventually, in consequence of the practice gained in the game, to carry the head erect. I am the less surprised at this, when I recall the fact that milkmaids and



## 42. Foot Bending.

Beginning with the Position at Start, either knee as in Exercise 39, or either leg extended as in Exercise 30*b*, is raised forward, and then the same foot is alternately bent upward and extended downward.

## 43. Foot Torsion.

In the position of the leg as in Exercise 42, the toes are directed alternately inward and outward; the foot is thus turned laterally inward and outward, in which action the leg and the thigh both participate.

## 44. Foot Rotation.

In the position of the leg as in Exercise 42, the foot describes a circle outward or inward, in which the toe is pointed first outward, then downward, then inward, lastly upward, and so on, or in reverse order.

The rotation should be as even as possible, and therefore it must be done slowly at first.

Exercises 42, 43, and 44 may also be taken in a sitting posture.

The foot exercises practise the muscles of the lower leg and of the foot, render the ankle more supple, and increase the circulation of the blood downward, thereby warming the feet and removing the blood from the upper part of the body.

others who are accustomed to carry a weight on the head almost invariably hold it erect. The reason for this erect carriage is easily seen; for these people, in order not to let their burden drop, must invariably hold the head exactly upright. The same result, however, would not be achieved in young people on whose heads heavy burdens were put; for, if the cervical vertebræ were pressed down too hard, they would easily bend to one side, especially if the object carried were not just in the middle." (Tissot: *Medizinischen und chirurgischen Gymnastik*, p. 293. Leipzig: 1782.)

Notice should also be taken of the fact that it is just a light object, intended to be balanced on the head so as to prevent its falling off, which calls out in a greater measure than a heavy object that muscular activity by which the equilibrium of the vertebral column and consequently that of the head is maintained. For a heavy object, by reason of its own weight, of itself lies firmer.

## WALKING, RUNNING, JUMPING.

**45. Spread Walk, with Forward Stride.**

The Spread Walk is performed either **without change of base**, as a so-called mock walk, then consisting in throwing forward the extended legs alternately ; or **with change of base**. In the course of this walk the legs are swung farther forward than is necessary for the completion of a pace. Before the foot is put down, the leg must consequently be swung back somewhat.

**46. Walk of Ascent.**

With each step the corresponding knee is raised high enough forward to bring the thigh in a horizontal line.

**47. Walk, Raising the Lower Leg.**

This is a mode of walking in which the lower leg is raised and swung backward, if possible so far that the whole heel shall touch the seat (cf. Exercise 40).

The last two modes of walking may also be practised either as a **mock walk** (without change of base) or as a **forward movement**.

**48. Running.**

Running is hopping from one foot to the other, descending, however, only on the toes and balls of the feet.

In the descent the knees should be slightly bent.

The running movement may take place either with or without change of base.

*a.* With **knees slightly raised**.

*b.* As a **Run of Ascent** (cf. Exercise 46).

*c.* As a **Spread Run** (cf. Exercise 45).

*d.* As a **Run, Raising the Lower Leg** (cf. Exercise 47).

For the run **without change of base**, it is advisable to rest the hands on the hips ; but in the run **with change of base**, the fore-arms should be held horizontal, while the upper arms hang freely down ; the fists should be tightly closed.

## **49. Jump with Heels Together.**

### *a. Without change of base.*

A rapid but slight bend of the knees, with heels raised, is followed by a vigorous straightening of the legs, which gives an upward spring to the whole body. The legs are together while the body is in the air; on reaching the floor the knees are immediately bent, and then straightened with a simultaneous lowering of the heels. **Only the forepart of the feet (toes and balls) should touch the floor at the end of the jump.** The upper part of the body remains upright, and the heels are kept together during the whole movement.

### *b. With change of base.*

The jump with change of base forward, backward, sideways, is taken in the same manner as that without change of base, the only difference being that the person lands about a pace away from the spot whence the upward jump took place.

## **50. Jump into the Straddling Position.**

After jumping up from the Position at Start, the legs are quickly parted sideways, so that the descent ends in the Straddling Position (see Fig. 24).

Then the jump upward is made in the Straddling Position, and during the descent the legs are brought together and into the Position at Start.

## **51. Jump Straddling in the Air.**

After a vigorous upward jump the extended legs are parted (in the Straddling Position) in the air, as far as possible, and **brought together again before the descent.**

This exercise is much facilitated by leaning with the hands on the back of a chair, or, preferably, on the edge of a table.

With every jump one should be most careful in coming down to land the body on the forepart of the feet, and not on the full sole; also, that the knee be bent without stretching the muscles of the leg. In this manner the shock experienced from the descent is diminished, and the concussion does not reach into the region of the spine and the brain.

The exercises of walking, running, and jumping render all the muscles of the legs active. In the first place, they invigorate the muscles and make the joints of the legs — hips, knees, and ankles — supple. Indirectly, they remove excess of blood from the head and chest, and promote activity in the abdominal organs. They are, therefore, useful in cases of stagnation in the vessels of the abdomen, and in cases of hemorrhoids or costiveness. Moreover, they have a general exciting action on the whole organism. This is capable of being graded from a moderate to a very intense effect by devoting only a short time to the gentler exercises of walking and running, and a longer time to the more active ones, especially the Spread Run and Run of Ascent.

Activity of the kind last referred to produces a lively quickening of circulation and respiration, and increases, in a marked degree, the metamorphosis of tissue in the system. Therefore, such an exercise may be warmly recommended to persons inclined to corpulence, if they are free from troubles of the heart or of the circulation. It is a useful substitute even for extensive walking trips and mountain climbing, justly esteemed as the latter are in cases of this kind.

## V. COMPOSITE EXERCISES.

### 52. Hewing Movement.

Put the feet sideways into the Straddling Position (see Fig. 24) ; extend the arms into a vertical position, and clench the fists.

From this position swing the arms forcibly downward, bending the trunk forward at the same time (Fig. 31). The knees should yield to the force of the swing by bending slightly.

In swinging the body and the arms upward, bend both head and trunk slightly backward.

This exercise brings almost the whole muscular system of the body into activity. It has, therefore, a general effect, which may be graded from a very



Fig. 31.



moderate to a very intense **excitation of the whole organism**. The motion of the humors of the body is accelerated, expiration becomes more effectual, and the tissue changes in the system are quickened. **More especially the activity of the abdominal organs is thereby both excited and regulated.**

### **53. Arm Swinging with Torsion (Mowing Movement).**

The arms are lifted forward to the horizontal, and in such a manner that in swinging the arm sideways to the right, the right arm remains extended, while the left is bent at the elbow-joint towards the front of the chest (Fig. 32).



Fig. 32.



Fig. 33.

In swinging the arms sideways to the left the left arm is extended and the right bent towards the front of the chest (Fig. 33).

The trunk is inclined forward somewhat by bending the hip-joint, and yields to the swing of the arms by a more or less vigorous torsion, without, however, changing the direction of the head.

By this exercise the muscles of the arms and all the muscles attached to the chest are rendered active. For this reason, — by means of the stimulation of the muscles referred to, — the exercise promotes indirectly a **good development of the chest and activity of respiration**. But it also has a **general invigorating effect**.

### **54. Knee Balancing, with Arm Stretching.**

Beginning with the Position at Start, the arms are bent (cf.

Exercise 18), and are then extended upward, while the heels are raised at the same time (Fig. 34).

Then the arms are again bent, and at the same time with a Deep Knee Bend (Squatting Position) are extended downward through the opening of the knees (Fig. 35).

In the Squatting Position the arms are again bent and then extended upwards while the body is straightened at the same time; and so on.

The heels remain raised till the exercise is ended.

If dumb-bells are used in this exercise, the arms are bent as in Arm-Thrusting, the forearms only being lifted forward to the horizontal.



Fig. 35.



Fig. 34.

## 55. The Mill with Bend.

This exercise starts from the Straddling Position, and consists in swinging the arms in a circle in front of the body, with Knee Balancing (Exercise 36) and Trunk Bending and Stretching.

Both arms are swung in a circle to the right, upward, to the left, and downward, continuing in this sequence, or in the opposite one. In swinging the arms upward to the right, the right knee is bent (Fig. 36), and it is stretched again as soon as the



Fig. 36.

arms have performed the upward swing; when the arms are lowered to the left the left knee is bent; when the arms describe the lower part of the circle, both knees are bent for a little while, then the left knee is straightened, and so on.

The trunk begins to be bent during the swing of the arms downwards, and it begins to be straightened during their swing upward.

### 56. Dumb-bell Shifting.

The feet are moved sideways into a wide Straddling Position while the arms are lifted forward perpendicularly. Then one turns on the heels to the left, in such a manner that the toes of the left foot are directed exactly sideways, while those of the right foot are directed forward. Then the left knee is bent beyond the line of the toes, while the right leg remains at full length, and with a simultaneous lowering of the arms the body is bent so far that, if possible, the dumb-bells or the fists touch the floor in front of the left foot (Fig. 37).



Fig. 37.

After rising again, the body is turned to the right on the heels and far enough to place the end of the right foot exactly sideways, and that of the left forward. Then the trunk is bent and the arms lowered in the direction of the right foot, and so on.

The last three exercises (Knee Balancing with Arm Stretching, the Mill with Bend, and Dumb-bell Shifting) strongly affect almost the whole muscular system of the body, **for which reason they strengthen the muscles generally and excite intensely the whole organism.** The effect is similar to that of the Hewing Movement (Exercise 52). The Mill with Bend, and Dumb-bell Shifting,

more particularly promote the activity of the abdominal organs, and resemble, in their effect, the exercise of Trunk Rotation (No. 8).

### 57. Support in Lying Forward.

The body is supported by resting the hands either on the edge of a table, or, with knees bent, on the front of the seat of a chair, or on the floor. Then a backward movement is made. Head, trunk, and legs should be in the same line; the arms are at full length (Fig. 38).

While thus supported, the arms are bent (Fig. 39), and straightened again; in doing which, one should be careful that the body does not lose its upright position.

The Support in Lying Forward, with its accompanying Arm Bending

and Stretching, acts very extensively on the muscular system of the trunk, also on that of the arms and legs. But the exercise calls out more particularly a vigorous activity of the dorsal muscles. It has therefore an invigorating effect on the muscular system generally, but principally on the dorsal muscles.

For this last reason these exercises are of advantage

in cases of relaxed and crooked carriage, also in cases of lateral curvature of the spine. The bending of the arm in Support in Lying Forward also enlarges the chest and improves activity of respiration. It is therefore useful also in cases of defective formation of the chest and defects in the organs of respiration, especially asthma.

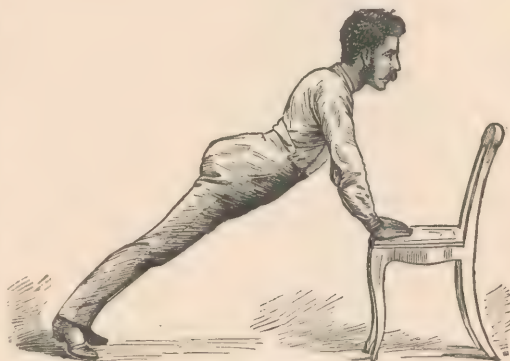


Fig. 38.



Fig. 39.



## VI. EXERCISES WITH THE WAND.

In the following exercises the backs of the hands are turned upward in grasping the wand;<sup>1</sup> the thumbs are held downward. The hands are about twice as far apart as the shoulders; it is only in Stepping up on the Wand (see Fig. 52) and Stepping over the Wand that they will need to be nearer together.



Fig. 40.

At the beginning of the exercise the wand is held horizontally in front of the body with arms downward and stretched. This is Position at Commencement (Fig. 40).

### 58. Wand Raising.

Starting from the Position at Commencement, the wand is raised forward either slowly, with arms extended, or with a swing:

- a. To a horizontal position of the arms.
- b. Over the head (Fig. 41).

It is then again lowered in front.

### 59. Wand Lowering backward.

- a. Till the arms are bent.

In the position of the wand held over the head, the arms are bent quietly and evenly till the wand touches the shoulders (Fig. 42, a, b).

- b. Till the arms are stretched.

The arms, bent as described above, are stretched downward. If necessary, a wider grasp of the wand may be taken in the beginning (Fig. 42, a<sup>1</sup>, b<sup>1</sup>).

The horizontal position of the wand should be preserved from

<sup>1</sup> With regard to the length and thickness of the wands the remarks on page 10 should be referred to. For vigorous persons it is desirable to use an iron wand instead of a wooden one, 40 inches (1 metre) long, and weighing from 4½ to 9 pounds (2 to 4 kilograms).

the beginning to the end of the exercise. Particular attention is to be paid to this.



Fig. 42.



Fig. 41.

## 60. Wand Raising over with Both Arms.

With arms stretched, the wand is raised or swung over the head in a horizontal position (Fig. 43,  $a^1$ ,  $b^1$ ), and then without in the least



Fig. 43.

bending the arms, it is lowered backward into a position called Deep Position of the Wand (Fig. 43,  $a$ ,  $b$ ). For this exercise also it will



be necessary at first not to keep the hands too far apart in grasping the wand.

### 61. Wand Weighing.

The wand is first held horizontally in front of the body and then swung upward to the right into a vertical position. The right arm remains stretched while the left is bent (Fig. 44, *a*, *b*).



Fig. 44.

Starting from this position of the wand on the right hand side, this same weighing movement to the left is next taken with the left arm stretched. But first, the wand is again held horizontally in front of the body and then swung to the left, without any interruption of the movement, while the right arm is bent (Fig. 44, *a*<sup>1</sup>, *b*<sup>1</sup>). Then follows the weighing of the wand to the right, and so on.

Throughout this exercise any displacement of the shoulders or hips, and any bending of the trunk, should be scrupulously avoided.

### 62. Wand Lowering sideways.

Starting from the position in which the wand is held over the head (see Fig. 41), the right arm, which remains stretched, brings the wand downward to the right hand side of the body; the left arm at the same time bends over the head, and in such a manner as to cause the upper arm to assume a vertical, and the forearm a horizontal position (Fig. 45). Neither the head nor the trunk should incline sideways in the least.

From this position the wand is raised horizontally over the head, with the left arm stretched, and then lowered to the left hand side, while the right arm is bent.

This exercise may be taken with or without a swing.



Fig. 45.

### 63. Wand Raising over with One Arm.

While, with arms stretched, either hand draws one end of the wand to its own side of the body, the other arm is bent over the head, and thus brings the wand into a vertical position near the body. The body and the wand are thereby brought into the same position, as shown in Fig. 45. Then the wand is lowered to a horizontal position behind the body (Fig. 46, *a*, *b*).

The arm first stretched remains so during the exercise, while the hand on the same side continues to touch the body up to the moment when the other arm, describing an arc backwards, has been fully extended (Fig. 46, *a*<sup>1</sup>, *b*<sup>1</sup>).



Fig. 46.

Raising the wand over from its position behind the body to a position in front of it is done in the same manner.



Fig. 47.

### 64. Arm Stretching sideways.

#### *a.* From the Bending Position forward.

The wand is held in front of the body with arms stretched downward. The arms are bent far enough to bring the wand on a line with the shoulders; then the left arm is stretched vigorously sideways. At the same time the right arm, which

remains bent, is raised to the height of the shoulders and follows the movement (Fig. 47).

Next, the right arm is stretched, while the left one is bent.



**b. From the Bending Position backward.**

The wand is lifted over the head. Then the arms are bent far enough to touch the shoulders with the wand (cf. Fig. 42, *a*, *b*).

In this position, first the left, then the right arm is extended in turn (Fig. 48).



Fig. 48.



Fig. 49.

**65. Wand Swinging sideways with Trunk Torsion.**

The wand, which is held horizontally in front of the body, with arms stretched downwards, is swung vigorously alternately to the right and left, while at the same time the trunk is twisted in the corresponding direction (Fig. 49).

The feet are placed as in the Position at Start, or as in that called Feet Touching.

**66. Walk with Legs Rigid, and Wand held backward.**

In this exercise the wand is placed squarely across the back and held with both arms bent. The clenched fists point to the front. The body is inclined slightly forward, and the shoulders are drawn back firmly, so that the chest may expand fully.

In this position a walk forward is taken with slow and moderately long steps (Fig. 50).



Fig. 50.

The muscles of the legs, particularly of that one which is striding forward, should be vigorously stretched. In putting the foot down the toes should touch the floor first.

### 67. Pass with the Wand held backward.

The position of the wand is the same as in the previous exercise.

After taking the Position at Start, the right foot is put forward two or three feet in the direction of the walk. **At the same time** the forward leg is bent till the knee is directly over the toes. The upper part of the body is inclined forward so that its direction corresponds with that of the hindmost leg. Both feet rest on the whole soles (Fig. 51).

From this Pass Position a return is made to the Position at Start by a vigorous push and drawing back of the right foot; then the left foot is put forward into the Pass Position.



Fig. 51.

The exercises with the wand described thus far are performed by the muscles of the shoulders and arms, and by dorsal muscles attached to the chest. These exercises **strengthen the muscles which surround the chest, expand the chest, and promote respiration.** The movements of Wand Lowering backward (Exercise 59) of Wand Raising over with Both Arms (Exercise 60), of the Walk with Legs Rigid (Exercises 66 and 67), and of the Pass with the Wand held backward, are particularly effectual in this respect. This whole group of exercises, and particularly those last named, if applied in cases of defective formation of the organs of respiration, of **asthma**, of incipient tubercles, also in cases of bent carriage, of defective formation of the chest, and of lateral curvature of the **spine**, will show an excellent result, for reasons stated above.

Wand Raising over with One Arm (Exercise 63) is very effectual in cases of lateral curvature of the **spine**, if the exercise is performed by that arm alone which is on the side nearest to the concavity (the **bending in**) of the curvature. A similar good effect is

obtained by Wand Lowering sideways (Exercise 62), but only towards the side of the convexity (the **bending out**) of the curvature; and by Arm Stretching sideways from the Bending Position backward (Exercise 64 *b*), which, however, for this purpose must be done only towards the side of the convexity of the curvature. Wand Swinging sideways with Trunk Torsion is useful also, if this is likewise done towards the side of the convexity of the curvature.

### 68. Stepping up on the Wand.

The wand is grasped with the hands somewhat farther apart than the width of the body, and is held horizontally in front of it. The hands are in the Raised Position, with the arms stretched downward.



Fig. 52.

Either foot steps up on the wand between the hands, with a vigorous bending of the knee; the supporting leg remains straight.

### 69. Stepping over the Wand.

The wand is held as in the previous exercise.

Either foot, with a swinging motion in raising the knee, steps over the wand between the hands, if possible without

touching it. After having stepped over, the forepart of the foot is set down lightly on the floor.

Then follows the stepping back with the same foot, or the other foot may step over forward after the first. In the latter case, stepping back with either foot causes a return to the original position.

Those who find difficulty in performing this exercise may, in the beginning, turn the lower part of the leg inward, as it goes over the wand.

Bending the trunk or the head forward, both in stepping up on the wand and in stepping over it, should, as far as possible, be avoided.

The effect of Stepping up on the Wand (Exercise 68), and still more, that of Stepping over the Wand (Exercise 69), is similar to that of Knee Raising forward (Exercise 39), that of the Walk of Ascent (Exercise 49), and that of the Run of Ascent, but it is even greater than these. These exercises excite the movement of the secretions in the vessels of the lower abdominal cavity, and the peristaltic action of the lower region of the intestines. For these reasons they are useful in cases of hemorrhoids or constipation.



### THIRD DIVISION.

## THE APPLICATION OF THE EXERCISES.

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### I. FOR HEALTHY PERSONS.

WHILE systematic bodily exercises are certainly available as a means of relieving or curing many diseased conditions, provided they are regularly persevered in, their chief value lies in the higher degree of normal and reliable action which they develop in the bodily functions, as well as in the tendency to improve the general nutrition of the body. Thereby either development of disease is arrested, or a direct protection against it is secured. Therefore one ought not to defer taking up gymnastics till the health has begun to break down, or defects in the outward form of the body have appeared; but, on the contrary, health should be secured by means of bodily exercise taken from earliest childhood until a late period of life.

In the earliest period of human life, that of *babyhood*, comprising the first year of existence, certainly no regular exercises of the body should be given. During this period care should be taken that a healthy action of the skin be favored by warm baths, by dry and clean clothing and bedding; also, that the child's body be not confined, either by its dress or by tightly swathing it. It is also of the highest importance that the child be given a chance, while lying, to move its body freely and vigorously, in kicking about, or by similar motions. But to force the child into sitting, standing, or walking too early should be carefully guarded against. One should await the time when the child, in the consciousness of its own increased strength, rises from the lying to the sitting posture, and perhaps wriggling from the latter, tries for the first time to stand up. Babies who are made to sit up too early are liable to have lateral

curvature of the spine. This, however, occurs also in children who are already able to sit up, but who are carried by the nurse **on one side**, on one arm only. It is well to facilitate the child's first effort at standing and walking by means of soft, well-fitting little shoes, which, however, should have a leather sole.

The age of babyhood is succeeded by that of **childhood**; the age which covers a period of six years after the completion of the child's first year, running therefore from the beginning of the second to the end of the seventh year, or to the time when school life begins. As regards the child's development, this period may be subdivided into two other periods, one of which comprises the second, the third, and a portion of the fourth year of life; the other, the subsequent years up to the seventh.

In the **first period** of childhood, the child's instinct is the surest guide for determining its mode of taking exercise; and romping and playing without restraint — preferably, if possible, in the open air, on pure dry sand — is the best gratification of the instinct. A light elastic ball, small wheelbarrows, carts, spades, and rakes are among the toys which the child likes best, and are most useful during this period. As early as this, one-sidedness in the child's activity should be guarded against, in order to avoid unevenness in the bodily development. The child should be taught to use both hands equally, as far as possible, in grasping and holding objects; and to alternate equally the right and left foot, in going up-stairs, after its own manner, in which one foot follows the one that has previously taken the upward step.

In the **second period** of childhood, the child's instinct for taking exercise should indeed still be largely gratified, but here also a more vigorous and more varied form of play may be induced by giving the child other toys. Besides the ball, which should still be much used, hoops to drive or to jump with, jump-ropes, and similar toys, answer this purpose. It is important, however, in order that injurious concussions of the body may be avoided, to teach the child to land from a jump **with elasticity**, on his toes and with bent knees, **and by no means with legs rigid**; nor should this kind of play be kept up **too long** or be turned into games of competition. Should headache or nausea ensue, this would show that there had been an injurious excess of this kind of play, and the closest attention should

be paid to such an occurrence. Besides these games, if the child is not so unfortunate as to live all alone, but has companions of its own kind, ball-playing and kindred games are desirable. Games of imitation, so called, also serve a good purpose. It would, besides, be useful to vary the games occasionally by bringing in free movements, such as bending the head forward, rotation of the head, bending the trunk, and its torsion, raising the arms forward and sideways, bending and stretching the arms, spreading the legs forward, walking without change of base, standing on the toes, bending the knee, etc. But not as a strict and formal performance ; rather as a game, and a merry attempt to imitate the one in the game who stands in the middle of a circle.

In addition to aiming at an activity in the child so regulated as to further its development, abstention from what hinders the accomplishment of this object has to receive equal attention during the **whole period of childhood**. With this end in view a proper dress should be provided. It must not be tight or cramping ; the underclothes, petticoats, or little trowsers should be fastened by elastic straps to a little waist, which should be either knit or crocheted, in order to allow free vent for the proper evaporation from the body. This arrangement relieves the upper abdominal region from compression and avoids the consequent injury to the organs of respiration and digestion. Tight garters should also be discarded, as they interfere with the proper development of the muscles of the calves. The stockings also should be fastened to the little waist by elastic straps, across the outer part of the thigh. The shoes should fit well ; they should be "rights and lefts," broad in front and low in the heel, and not press the toes together so as to hinder the development of the foot. Such measures as these will materially further the whole development of the child, in so far as they remove, as much as possible, all obstruction to the freedom of active motion.

The age of childhood is followed by the **school age**, that portion of life which is to be devoted to the child's development by means of the school, generally embracing with boys the years from seven to fourteen or fifteen, and with girls those from seven to thirteen or fourteen. For their bodily development at this period of their lives it is best and most natural that both boys and girls should romp in



the open air with companions of their own age, and besides take part in the gymnastic exercises of the school. If outward circumstances do not demand abstention from the gymnastic instruction in the school, the pupils should not by any means be allowed to dispense with it; but in most cases the gymnastic course of instruction is not sufficient to produce a sound development of the body, especially in large cities, where the life is so largely indoors. In these cases, excursions abroad and stirring exercise by means of games in the open air should be added, in order thoroughly to ventilate and excite the lungs, and as means for preparing good blood. A well-ordered practice of home gymnastics would also supplement the gymnastics of the school and, jointly with the latter, produce good results. But if, for good reasons, boys and girls have to be cut off from the gymnastic course at the school, they should, besides taking active exercise in the open air, have a substitute for the gymnastic instruction at the school in well-ordered and extended practice of home gymnastics.<sup>1</sup> With a view to such a practice the school age should be divided into two periods: the *earlier* one reaching from the seventh to perhaps the tenth year of the child's life; and the *later* one comprising the age from ten to fifteen.

In the earlier period boys and girls may both practise the same exercises found in "Home Gymnastics," because the difference of sex is of little moment, during this period, as regards the kind of bodily exercise taken; but during the later one a distinction in this respect is quite necessary. For girls, whom conventionalities forbid to romp in the open air as much as boys, who consequently lead more of an indoor life and are longer in a sitting posture, and who show a poorly developed chest and defective formation of the blood (*anæmia*), great importance should be attached, in the practice of home gymnastics, to such exercises as develop the chest. The exercises with the wand (Examples of Exercises, pages 63 to 68) lead particularly to such a result.

The reason why so much importance attaches to a special culture of the body during the school age is that during the early period of this age, by the change consequent upon the school life, many circumstances arise which are injurious to bodily development. The

<sup>1</sup> Where circumstances permit, it is desirable to have parallel bars or a couple of hanging ropes with rings attached, somewhere at home.



time long spent in a confined space, and the vitiated air breathed in it, are unfavorable to the formation of blood; the prolonged sitting posture at school, also at home while attending to the duties there, does not allow a really vigorous development of the muscles, and is moreover often a cause for the appearance of lateral curvature of the spine. The excitation of the brain, while the mind is on the stretch, produces a kind of headache termed *school headache*, renders the child nervous, and affects unfavorably the whole development of the organism. It is at this time that it becomes of greatest importance to secure, for this age also, a sound development, reëstablishing as far as possible natural conditions. In the later period puberty frequently brings disturbances in its train. With very strong individuals its too rapid development, which may temporarily absorb in one direction only all the forces of the organism, should be counteracted by a muscular activity requiring exertion followed by fatigue, thereby providing a vent. In other cases where puberty is accompanied by depression of the organism, lassitude, uncomfortable feelings, and distaste for mental or physical labor, gymnastic exercises which excite in a mild way only will be both agreeable and useful. In every case, however, in which disturbances connected with sexual development assume a graver character, the advice of a physician in regard to the practice of gymnastics should not be dispensed with.

During the **age of adolescence**, which extends to the time when complete maturity of the organism is attained, — being towards the twenty-fourth year in men and about the twentieth year in women, — in the beginning the same circumstances and conditions generally prevail, more or less, in regard to need for bodily exercise, as governed the school age. In the later portion of this period the same physical exercises are called for as are required by strong men and women who have completed their development (Examples of Exercises, pages 68 to 70).

The **age of maturity** gradually develops from the outgrowth of conditions existing in the previous period. It may also be divided into two periods, the first of which comprises the time when energy and buoyancy are at their height, the second being the one in which strength is as fully maintained, but a quieter and less animated mode of procedure in the activities of life is manifested. The former

generally runs up to the fortieth year ; the latter in men up to the fiftieth, in women up to or towards the end of the fortieth year. The transition from one period to the other, however, depends upon the general condition of strength of the individual, and frequently takes place much later in strong persons than in weak. Constant bodily exercise may, however, retard the transition under any circumstances.

In the age when strength and the capacity for vigorous work is at its full height, exercise becomes necessary to life. The forms most suitable to men under such conditions are those that are most complicated and make the largest demand on the strength and capacity of the body. For women, however, dexterity more than strength is what ought to be aimed at, at this age, as at all ages.

During the second period of maturity, gymnastic exercises should be performed less rapidly than in that period when strength and buoyancy are at their height, but with no less demand on the muscular power. It is well to mention here that any diminution of intensity, however moderate, in the performance of the exercises ought to be counterbalanced by their longer duration. This should be particularly remembered by those persons who are inclined to **corpulence**, as is apt to be the case with strong and well nourished people because of their increased tranquillity of body and mind (Examples of Exercises : pages 70 to 74).

From the age of maturity, the transition is gradual to **old age**, with its decline of strength. It begins at different periods, according as the strength of the individual is greater or less, and it can be retarded by means of regular bodily exercise. One who from childhood, throughout youth and maturity, has regularly exercised the body, will preserve strength and freshness for a long time, and remain young longer than one who neglects activity of the body and hence becomes infirm and decrepit at an early age. Even after old age has set in, bodily exercises are still desirable, in order to preserve as much as possible a large amount of strength. The exercises should, however, be in harmony with the age and its attendant circumstances ; they should be such as have a quiet and mild effect ; consequently violent or sudden exercises or those that call for great exertion ought to be entirely avoided. As age increases these considerations demand increasing attention (Examples of Exercises, pages 74 to 76).

## EXAMPLES OF EXERCISES.

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### DIRECTIONS FOR THE PROPER USE OF HOME GYMNASTICS FOR HEALTHY PERSONS.

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#### PRELIMINARY REMARKS.

1. IN the grouping of the following examples the object has been to allow all the parts of the body to be actively affected. These groups may serve as a sample for the arrangement of other similar groups.

2. For a prolonged period of time only **one and the same** group of exercises should be taken, and it should be taken **every day**.

3. Weak persons, in deciding upon their daily exercises, should take up each group once only ; as strength increases, the same group should be repeated.

4. Those persons who are not in the habit of taking exercise, and weak persons who find the exercises which are indicated as coming within the compass of their age too hard, should at first go back to the exercises laid down for an earlier age.

5. The exercises should be performed exactly in accordance with the description given in the Second Division, close attention being paid to the carriage, the position, and the movements illustrated by the woodcuts. Exercises in which **only one arm** or **one leg** is active should be performed, as is self-evident, alternately with the right arm or leg and the left.

6. After each exercise a short pause should be made for rest, which should be used for deep and quiet breathing. Two or three times, however, during the performance of a group, the pause should be devoted to taking walking or running exercises, proper forms of which are given under the head of Examples of Exercises.

7. In regard to **dress**, particulars will be found on page 13.

# FOR BOYS AND GIRLS OF FROM SEVEN TO TEN YEARS.

## I.

Each separate exercise should be performed from six to twelve times, interspersed with an ordinary walk (cf. Exercise 45).

Exercise.

- 2 a. **Head Bending** forward } (Fig. 4).
- 2 a. **Head Bending** backward }
- 5. **Trunk Bending** forward } (Fig. 4).
- 5. **Trunk Bending** backward }
- 12. **Arm Raising** forward.
- 11. **Arm Raising** sideways (Fig. 7).
- 13. **Arm Swinging** sideways (cf. Fig. 7).
- 31. **Leg Spreading** forward, to the right, to the left (cf. Fig. 21); moderately by girls.
- 41. **Standing on the Toes and on the Soles** alternately, as in Foot Balancing (Fig. 30).
- 36. **Little Knee Bend**, as in Knee Balancing (Fig. 25).

## II.

Each separate exercise should be performed from six to twelve times, interspersed with the Spread Walk with Forward Stride (Exercise 45).

Exercise.

- 41. **Standing on the Toes** (Foot Balancing) in the position of Feet Touching (cf. Fig. 30).
- 36. **Little Knee Bend** (Fig. 25).
- 40. **Raising the Lower Leg** (Fig. 29).
- 30 b. **Leg Raising** forward (cf. Fig. 22); moderately by girls.
- 30 a. **Leg Raising** sideways (Fig. 21); moderately by girls.
- 15. **Arm Spreading**.
- 18. **Arm Stretching** forward } (Fig. 12).
- 18. **Arm Stretching** sideways }
- 18. **Arm Stretching** upward }
- 4. **Trunk Torsion** to the left and to the right (Fig. 3).
- 5. **Trunk Bending** forward and backward (Fig. 4).
- 1. **Head Rotation** to the left and to the right (Fig. 1).



## III.

Each separate exercise is to be taken from six to twelve times, interspersed with an ordinary walk with the wand held backward (cf. Exercise 67, Fig. 51).

## Exercise.

- 2 *b*. **Head Bending** sideways (Fig. 2).
- 6. **Trunk Bending** sideways to the right } (Fig. 5).
- 6. **Trunk Bending** sideways to the left }
- 4. **Trunk Torsion** to the right and to the left, with the arms lifted forward (Fig. 3).
- 19. **Arm Stretching backward** downward (Figs. 13, 14).
- 16. **Arm Rotation** backward }
- 16. **Arm Rotation** forward } (Fig. 9).
- 58 *a*. **Wand Raising** to a horizontal position of the arms.
- 58 *b*. **Wand Raising** over the head (Fig. 41).
- 61. **Wand Weighing** to the right and to the left (Fig. 44).
- 46. **Walk of Ascent** without change of base, and with moderate Knee Raising.
- 49 *a*. **Jump with Heels Together** without change of base.
- 38 *a*. **Alternate Knee Bend** in the Pace Position forward (Fig. 27).

## IV.

Each separate exercise is to be taken from six to twelve times, interspersed with the Spread Walk (Exercise 45) with the wand held backward (cf. Exercise 67, Fig. 51).

## Exercise.

- 41. **Standing on the Toes and on the Soles** alternately (Fig. 30).
- 30 *c*. **Leg Raising** diagonally forward.
- 30 *a*. **Leg Raising** sideways (Fig. 21).
- 30 *c*. **Leg Raising** diagonally backward.
- 36. **Little Knee Bend** (Fig. 25).
- 49 *a*. **Jump with Heels Together** without change of base.
- 58 *b*. **Lifting the Wand** over the head (Fig. 41).
- 59 *a*. **Wand Lowering** backward till the arms are bent (Fig. 42, *a*, *b*).

59 *b*. **Wand Lowering** backward till the arms are extended (Fig. 42, *a*<sup>1</sup>, *b*<sup>1</sup>).

62. **Wand Lowering** sideways (Fig. 45).

18. **Arm Stretching** forward, the arms alternating } (Fig. 12).

18. **Arm Stretching** upward, " " " }

22. **Beating with the Forearm** in the Raised Position (Fig. 17).

23. **Beating with the Forearm** in the Ridge Position (Fig. 19).

5. **Trunk Bending** forward and backward (Fig. 4).

6. **Trunk Bending** to the right and to the left sideways (Fig. 5).

1. **Head Rotation** to the right and to the left (Fig. 1).

## FOR BOYS OF FROM TEN TO FIFTEEN YEARS.

### V.

Each separate exercise is to be taken from six to twelve times, interspersed with the Spread Walk (Exercise 45), and the Spread Run (Exercise 48 *c*).

#### Exercise.

1. **Head Rotation** to the left and to the right (Fig. 1).

2 *a*. **Head Bending** forward and backward.

4. **Trunk Torsion** to the left and to the right (Fig. 3).

5. **Trunk Bending** forward and backward (Fig. 4).

15. **Arm Spreading** with a swing.

14. **Arm Swinging** forward and backward (Fig. 8).

20. **Arm Thrusting** forward.

20. **Arm Thrusting** sideways.

31. **Leg Spreading** sideways (Fig. 21).

39. **Knee Raising** forward, and Leg Stretching (Fig. 28).

40. **Raising the Lower Leg**, the whole heel touching the seat (Fig. 29).

37. **Deep Knee Bend** (Fig. 26).

50. **Jump into the Straddling Position.**

57. **Arm Bending with Support in Lying Forward** (Figs. 38, 39).

34. **Leg Torsion** (Fig. 24).

## VI.

Each separate exercise is to be performed from six to twelve times, interspersed with the Walk and the Run, Raising the Lower Leg (Exercises 47 and 48 *d*).

Exercise.

33. **Leg Rotation.**
- 32 *a*. **Leg Swinging** forward and backward (Fig. 22).
37. **Deep Knee Bend** (Fig. 26).
- 49 *a*. **Jump with Heels Together** without change of base.
- 49 *b*. **Jump with Heels Together** forward.
57. **Arm Bending with Support in Lying Forward** (Figs. 38, 39).
- 38 *b*. **Alternate Knee Bend** in the Straddling Position.
22. **Beating with the Forearm** in Raised Position simultaneously (Fig. 17).
22. **Beating with the Forearm** in Raised Position alternately (Fig. 18).
- 17 *a*. **The Mill** with Both Arms (Figs. 10, 11).
20. **Arm Thrusting** upward.
20. **Arm Thrusting** downward (Fig. 15).
6. **Trunk Bending** sideways, to the right and to the left (Fig. 5).
8. **Trunk Rotation.**
- 2 *b*. **Head Bending** sideways, to the right and to the left (Fig. 2).
3. **Head Rotation.**

## FOR GIRLS OF FROM TEN TO FOURTEEN YEARS.

## VII.

Each separate exercise is to be performed from six to twelve times, interspersed with an ordinary run (cf. Exercise 48).

Exercise.

1. **Head Torsion** to the left and to the right (Fig. 1).
- 2 *a*. **Head Bending** forward and backward.
4. **Trunk Torsion** to the left and to the right (Fig. 3).
5. **Trunk Bending** forward and backward (Fig. 4).
10. **Shoulder Movement** forward and backward.

- 60. **Lifting the Wand over** with Both Arms (Fig. 43).
- 61. **Wand Weighing** to the right and to the left (Fig. 44).
- 64 *a*. **Arm Stretching sideways** with the Wand, from the Bending Position in front (Fig. 47).
- 23. **Beating with the Forearm** in the Ridge Position (Fig. 19).
- 18. **Arm Stretching forward**
- 18. **Arm Stretching sideways** } (Fig. 12).
- 18. **Arm Stretching upward** }
- 30 *b*. **Leg Raising forward** (cf. Fig. 22).
- 30 *a*. **Leg Raising sideways** (Fig. 21).
- 36. **Little Knee Bend** (Fig. 25).
- 38 *a*. **Alternate Knee Bend** in the Pace Position forward (Fig. 27).
- 49 *a*. **Jump with the Heels Together** without change of base.
- 44. **Foot Rotation.**
- 41. **Standing on the Toes and on the Soles** alternately (Fig. 30).

### VIII.

Each separate exercise is to be performed from six to twelve times, interspersed with a Run with Knees slightly Raised, both without change of base and with change of base (Exercise 48 *a*).

#### Exercise.

- 42. **Foot Bending.**
- 33. **Leg Rotation.**
- 32 *a*. **Leg Swinging forward and backward**, moderately (Fig. 22).
- 36. **Little Knee Bend** (Fig. 25).
- 49 *b*. **Jump with the Heels Together forward.**
- 19. **Arm Stretching backward** downward (Figs. 13, 14).
- 16. **Arm Rotation** (Fig. 9).
- 61. **Wand Weighing** (Fig. 44).
- 63. **Lifting the Wand over** with One Arm to the left and to the right (Fig. 46).
- 64 *b*. **Arm Stretching sideways** with the Wand from the Bending Position backward (Fig. 48).
- 65. **Wand Swinging sideways**, with Trunk Torsion (Fig. 49).
- 57. **Support in Lying Forward**, resting on a table, with moderate Arm Bending and Stretching (Figs. 38, 39).



6. **Trunk Torsion** sideways, to the right and to the left (Fig. 5).
5. **Trunk Torsion** forward and backward (Fig. 4).
- 2 *b*. **Head Bending** sideways, to the right and to the left (Fig. 2).
3. **Head Rotation.**

## FOR THE AGE OF ADOLESCENCE.

### FOR YOUNG MEN.

#### IX.

Each separate exercise is to be taken from eight to sixteen times, interspersed with the Walk with Legs Rigid and Wand held backward (Exercise 66, Fig. 50).

#### Exercise.

- 38 *b*. **Alternate Knee Bend** in the Straddling Position.
40. **Raising the Lower Leg** with a Swing (Fig. 29).
37. **Deep Knee Bend** (Fig. 26).
51. **Jump Straddling in the Air.**
67. **Pass** with the Wand held backward (Fig. 51).
68. **Stepping up on the Wand** with the right and the left foot (Fig. 52).
69. **Stepping over the Wand** with the right and the left foot.
60. **Lifting the Wand over** with Both Arms (Fig. 43).
63. **Lifting the Wand over** with One Arm (Fig. 46).
53. **The Mowing Movement** (Figs. 32, 33).
- 25 *a*. **Spoke Stroke** to the right and to the left.
- 25 *c*. **Ridge Stroke** to the right and to the left.
57. **Arm Bending** with Support in Lying Forward (Figs. 38, 39).
5. **Trunk Rotation** forward and backward (Fig. 4).
- 2 *b*. **Head Rotation** sideways, to the left and to the right (Fig. 2).

#### X

Each separate exercise is to be taken from eight to sixteen times, with dumb-bells, if possible, for the exercises of the arms and hands.

#### Exercise.

3. **Head Rotation.**
7. **Trunk Bending** from a Position of Torsion to the left and to the right (Fig. 6).

13. **Arm Swinging** sideways (cf. Fig. 7).
14. **Arm Swinging** forward and backward (Fig. 8).
- 17 *b*. **The Mill** with One Arm to the left and to the right.
- 17 *a*. **The Mill** with Both Arms (Figs. 10, 11).
20. **Arm Thrusting** upward.
20. **Arm Thrusting** downward (Fig. 15).
- 25 *a*. **Spoke Stroke** to the right and to the left.
- 25 *b*. **Raised Stroke** to the right and to the left.
- 26 *a*. **Hand Bending** and Stretching upward and downward (Fig. 20).
- 32 *a*. **Leg Swinging** forward and backward (Fig. 22).
- 32 *b*. **Leg Swinging** outward and inward (Fig. 23).
50. **Jump into the Straddling Position**, and
- 35 *a*. **Drawing the Legs Together**.
- 49 *b*. **Jump with the Heels Together** forward and backward.
39. **Knee Raising** forward, and Leg Stretching (Fig. 28).

## FOR THE AGE OF ADOLESCENCE.

### FOR YOUNG WOMEN.

#### XI.

Each separate exercise is to be taken from six to twelve times, interspersed with the (moderate) Spread Walk with Forward Stride (Exercise 45).

#### Exercise.

3. **Head Rotation**.
4. **Trunk Torsion** to the left and to the right (Fig. 3).
6. **Trunk Bending** sideways, to the left and to the right (Fig. 5).
15. **Arm Spreading**.
13. **Arm Swinging** sideways (cf. Fig. 7).
14. **Arm Swinging** forward and backward (Fig. 8).
18. **Arm Stretching** forward, backward, upward, and downward (Fig. 12).
- 26 *a*. **Hand Bending** upward and downward (Fig. 20).
- 26 *b*. **Hand Bending** sideways.
30. **Leg Raising** forward (moderately), and backward.
30. **Leg Raising** sideways, moderately (Fig. 21).

- 36. **Little Knee Bend** (Fig. 25).
- 49 *b*. **Jump with the Heels Together**, forward and backward.
- 42. **Foot Bending**.
- 43. **Foot Torsion**.
- 41. **Foot Balancing** (Fig. 30).

## XII.

Each separate exercise is to be taken from six to twelve times, interspersed with the Run with Knees slightly Raised, without change of base and with change of base (Exercise 48 *a*).

Exercise.

- 44. **Foot Rotation**.
- 33. **Leg Rotation**.
- 38 *a*. **Alternate Knee Bend** in a Pace Position forward (Fig. 27).
- 36. **Little Knee Bend** (Fig. 25).
- 49 *b*. **Jump with the Heels Together**, sideways, to the right and to the left.
- 61. **Wand Weighing** to the right and to the left (Fig. 44).
- 63. **Wand Raising over** with One Arm (Fig. 46).
- 60. **Wand Raising over** with Both Arms (Fig. 43).
- 64 *a*. **Arm Stretching sideways** with the Wand from the Bending Position forward (Fig. 47).
- 65. **Wand Swinging** sideways with Trunk Torsion (Fig. 49).
- 19. **Arm Stretching backward** downward (Figs. 13, 14).
- 18. **Arm Stretching** forward, sideways, upward, and downward (Fig. 12).
- 57. **Arm Bending** with Support in Lying Forward (Figs. 38, 39).
- 5. **Trunk Bending** forward and backward (Fig. 4).
- 2 *b*. **Head Bending** sideways, to the right and to the left (Fig. 2).
- 1. **Head Torsion** to the right and to the left (Fig. 1).

## FOR THE AGE OF MATURITY.

## FOR MEN.

## XIII.

Each separate exercise is to be taken from eight to sixteen times, — the exercises marked \* to be performed with dumb-bells if

possible, — interspersed with the Spread Walk (Exercise 45) and the Spread Run (Exercise 48 *c*).

Exercise.

- 1 *a*. **Head Bending** forward and backward.
5. **Trunk Bending** forward and backward (Fig. 4).
65. **Wand Swinging** sideways, with Trunk Torsion (Fig. 49).
12. **Arm Raising** forward, with Dumb-bells or Wand (cf. Fig. 41).
15. \* **Arm Spreading**.
20. \* **Arm Thrusting** forward, upward, and downward (Fig. 15).
- 25 *b*. \* **Raised Stroke**.
- 26 *a*. \* **Hand Bending** upward and downward (Fig. 20).
- 32 *a*. **Leg Swinging** forward and backward (Fig. 22).
54. \* **Knee Balancing**, with Arm Stretching (Figs. 34, 35).
56. **Dumb-bell Shifting** (Fig. 37).
40. **Lifting the Lower Leg** with a Swing (Fig. 29).
35. **Drawing the Legs Together**.
62. **Wand Lowering sideways** (Fig. 45).
67. **Pass** with the Wand held backward (Fig. 51).
42. **Foot Bending** upward and downward.

XIV.

Each separate exercise is to be performed from eight to sixteen times, — the exercises marked \* to be taken with dumb-bells if possible, — interspersed with the Walk with Legs Rigid and Wand held backward (Exercise 66, Fig. 50).

Exercise.

- 2 *b*. **Head Bending** sideways, to the left and to the right (Fig. 2).
7. **Trunk Bending** from a Position of Torsion (Fig. 6).
14. \* **Arm Swinging** forward and backward (Fig. 8).
22. \* **Beating with the Forearm** in Raised Position, simultaneously (Fig. 17).
22. \* **Beating with the Forearm** in Raised Position, alternately (Fig. 18).
20. \* **Arm Thrusting** upward and downward (Fig. 15).
- 25 *a*. \* **Spoke Stroke**.
27. \* **Hand Rotation**.
- 32 *b*. **Leg Swinging** outward and inward (Fig. 23).



- 55. **The Mill with Bend** (Fig. 36).
- 53. **Mowing Movement** (Figs. 32, 33).
- 39. **Knee Raising** forward and **Leg Stretching** (Fig. 28).
- 49 *b*. **Jump with the Heels Together**, with change of base.
- 59. **Wand Lowering** backward (Fig. 42).
- 61. **Wand Weighing** (Fig. 44).
- 41. **Foot Balancing** (Fig. 30).

## XV.

Each separate exercise is to be performed from eight to sixteen times, — those marked \* to be taken with dumb-bells if possible, — interspersed with the Walk of Ascent and the Run of Ascent (Exercises 46 and 48 *b*).

## Exercise.

- 3. **Head Torsion.**
- 4. **Trunk Torsion** with arms raised forward (Fig. 3).
- 8. **Trunk Rotation.**
- 11. \* **Arm Raising** sideways (Fig. 7).
- 20. \* **Stamping** (Fig. 16).
- 17. \* **The Mill with Both Arms** (Figs. 10, 11).
- 23. \* **Beating with the Forearm** in the Ridge Position (Fig. 19).
- 24. \* **Hashing Movement.**
- 27. \* **Hand Rotation.**
- 33. **Leg Rotation.**
- 52. \* **Hewing Movement** (Fig. 31).
- 51. **Jump Straddling in the Air.**
- 57. **Arm Bending**, in Support in Lying Forward (Fig. 39).
- 63. **Wand Raising over** with One Arm (Fig. 46).
- 60. **Wand Raising over** with Both Arms (Fig. 43).
- 68. **Stepping up on the Wand** (Fig. 52).
- 69. **Stepping over the Wand.**
- 44. **Foot Rotation.**

## XVI.

Each separate exercise is to be performed from eight to sixteen times, — the exercises marked \* to be taken with dumb-bells, —

interspersed with the Walk with Legs Rigid and Wand held backward (Exercise 66, Fig. 50).

Exercise.

41. **Foot Balancing** (Fig. 30).
37. **Deep Knee Bend** (Fig. 26).
39. **Knee Raising forward** and Leg Stretching (Fig. 28).
32. **Leg Swinging** over the back of a chair.
50. **Jump into the Straddling Position**, and
35. **Drawing the Legs Together.**
55. \* **The Mill with Bend** (Fig. 36).
5. **Trunk Bending** forward and backward (Fig. 4).
16. \* **Arm Rotation** (Fig. 9).
14. \* **Arm Swinging** forward and backward (Fig. 8).
15. \* **Arm Spreading.**
20. \* **Arm Thrusting** in different directions.
- 25 c. \* **Ridge Stroke.**
- 26 a. \* **Hand Bending** upward and downward (Fig. 20).
- 1 a. **Head Bending** forward and backward.

## FOR THE AGE OF MATURITY.

### FOR WOMEN.

#### XVII.

Each separate exercise is to be taken from six to twelve times, interspersed with the Spread Walk with moderate Forward Stride (Exercise 45).

Exercise.

- 2 a. **Head Bending** forward and backward.
5. **Trunk Bending** forward and backward (Fig. 4).
4. **Trunk Torsion** with the arms raised forward (Fig.
11. **Arm Raising** sideways (Fig. 7).
15. **Arm Spreading.**
16. **Arm Rotation** backward } (Fig. 9).
16. **Arm Rotation** forward }
18. **Arm Stretching** forward, upward, and downward (Fig. 12).
19. **Arm Stretching backward** downward (Figs. 13, 14).

- 26 *a*. **Hand Bending** upward and downward (Fig. 20).
- 30. **Leg Bending** forward and backward.
- 36. **Little Knee Bend** (Fig. 25).
- 40. **Raising the Lower Leg** (Fig. 29).
- 41. **Foot Balancing** (Fig. 30).
- 44. **Foot Rotation.**

## XVIII.

Each separate exercise is to be taken from six to twelve times, interspersed with the Run with Knees slightly Raised (Exercise 48 *a*).

Exercise.

- 42. **Foot Bending.**
- 38 *a*. **Alternate Knee Bend** in a Pace Position forward (Fig. 27).
- 33. **Leg Rotation.**
- 39. **Knee Raising** forward, moderately, and Leg Stretching. (Fig. 28).
- 27. **Hand Rotation.**
- 58 *b*. **Raising the Wand** over the head (Fig. 41).
- 61. **Wand Weighing** (Fig. 44).
- 63. **Raising the Wand over** with One Arm (Fig. 46).
- 60. **Raising the Wand over** with Both Arms (Fig. 43).
- 64 *a*. **Arm Stretching sideways** from the Bending Position forward (Fig. 47).
- 64 *b*. **Arm Stretching sideways** from the Bending Position backward (Fig. 48).
- 65. **Wand Swinging** sideways, with Trunk Torsion (Fig. 49).
- 6. **Trunk Bending** sideways (Fig. 5).
- 3. **Head Rotation.**
- 1. **Head Torsion** (Fig. 1).

## FOR OLD AGE.

## XIX.

Each separate exercise is to be taken from five to ten times, with a quiet movement and in a moderate tempo, — but the Hand Friction from twenty to forty times, — interspersed with the Spread Walk with moderate Forward Stride (Exercise 45).

Exercise.

1. **Head Torsion** (Fig. 1).
5. **Trunk Bending** forward and backward (Fig. 4).
8. **Trunk Torsion.**
11. **Arm Raising** sideways (Fig. 7).
13. **Arm Swinging** sideways (cf. Fig. 7).
16. **Arm Rotation** backward } (Fig. 9).
16. **Arm Rotation** forward }
18. **Arm Stretching** forward and downward (Fig. 12).
21. **Hand Friction.**
29. **Finger Spreading** and Closing into Fists.
30. **Leg Raising** forward and backward (cf. Fig. 22).
36. **Little Knee Bend** (Fig. 25).
44. **Foot Rotation.**

XX.

Each separate exercise is to be taken from five to ten times, with quiet movement and in a moderate tempo, — but the Hand Friction from twenty to forty times, — interspersed with the Walk with Knees slightly Raised (Exercise 48 a).

Exercise.

- 2 a. **Head Bending** forward and backward.
6. **Trunk Bending** sideways, to the right and to the left (Fig. 5).
8. **Trunk Rotation.**
12. **Arm Raising** forward.
14. **Arm Swinging** forward and backward (Fig. 8).
15. **Arm Spreading.**
18. **Arm Stretching** upward and downward (Fig. 12).
21. **Hand Friction.**
- 26 a. **Hand Bending** upward and downward (Fig. 20).
33. **Leg Rotation.**
- 38 a. **Alternate Knee Bend** in a Pace Position forward (Fig. 27).
41. **Foot Balancing** (Fig. 30).

XXI.

Each separate exercise is to be taken from five to ten times, with quiet movement and in a moderate tempo, — but the Hand Friction



from twenty to forty times, — interspersed with the Walk with moderate Raising of the Lower Leg (Exercise 47).

Exercise.

- 2 *b*. **Head Bending** sideways, to the right and to the left (Fig. 2).
- 4. **Trunk Torsion** (Fig. 3).
- 8. **Trunk Rotation.**
- 17. **The Mill** with One Arm, to the left and to the right (cf. Fig. 10).
- 22. **Beating with the Forearm** in the Raised Position (Fig. 17).
- 18. **Arm Stretching** forward, upward, and downward (Fig. 12).
- 21. **Hand Friction.**
- 27. **Hand Rotation.**
- 32 *a*. **Leg Swinging** forward and backward (Fig. 22).
- 40. **Raising the Lower Leg** (Fig. 29).
- 42. **Foot Bending.**

## THE APPLICATION OF THE EXERCISES.

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### II. FOR INVALIDS.

THE exercises of home gymnastics are intended to be applied in many cases of chronic ill health, but only in those which are free from inflammatory or febrile conditions. They may be used partly as an adjunct to other modes of treatment, partly as a means for obtaining an improvement only, or even for effecting a complete cure. In all cases, however, in which symptoms of ill health are marked by evident disturbances of the general well-being, by a large diminution of the general activity and capacity for work, by harassing weakness, or by the interruption of the functions of any important organ, the layman must not by any means, on his own authority, try to obtain relief in the exercises of home gymnastics, **but should first seek the advice of a physician.** It would then remain for the physician to decide as to the kind of treatment best adapted to the case, and whether any kind of gymnastic exercise, either by itself, or in connection with another mode of treatment, should be taken.

The following may be named as the principal cases in which the practice of home gymnastics is capable of yielding good results.

1. General debility; retarded development of the whole organism, poverty of the blood and anæmia, defective formation of the chest and of the organs of respiration (weak chest).

In troubles of this kind the aim should be, by good food and vigorous breathing<sup>1</sup> of pure air to establish the first conditions for a

<sup>1</sup> Vigorous breathing is best accomplished in a standing position, with the arms at the sides of the body, or the hands laid loosely on the hips, or the arms on the back. The cavity of the chest should be slowly expanded to its full extent by raising the ribs, thereby allowing a large amount of air to stream into the lungs. When at the height of inspiration the greatest expansion of the chest is reached,

healthy formation of the blood. But in addition a **mild** excitement of the muscular activity by means of easy exercises will promote the minute tissue changes of the body, increase the activity of respiration, and bring about a more normal action of the nerves, while the general state of health will be bettered (Exercises, pp. 85 to 88).

Where the aim is to act more especially on the chest because of **abnormal development**, all those exercises are very appropriate which expand the chest, such as Shoulder Raising, Shoulder Movement backward and forward, Arm Raising and Swinging, Arm Spreading, Arm Rotation, Arm Stretching backward and downward, Beating with the Forearm in the Raised Position, the Mowing Movement, Support in Lying Forward with Arm Bending, also most of the exercises with the wand. But it should be borne in mind that in cases of this kind also, no good result is attainable unless the practice of gymnastic exercises **be continued for a long time with absolute regularity** and with a moderate increase of intensity, by slow and gradual degrees of progress from the mild form, in which it should be begun. On the other hand, if the organism be subjected to excessive exertions, harm generally results, and often great harm (Exercises, pp. 87, 88).

2. **Stagnation in the organs of the abdomen, constipation, stagnation in the system of the portal veins, and hemorrhoids.**

Constipation or habitual costiveness, also hemorrhoids, which are caused by stagnation of the abdominal veins, appertaining to the system of portal veins, often produce disturbances in remote parts of the body, such as rush of blood to the head and accompanying tension of the head, headache, and dizziness; rush of blood to the chest with consequent heaviness and oppression in the chest and palpitation of the heart; even general nervous and psychical depression which may grow into hypochondria and melancholia. Bodily exercises, undertaken with energy and regularity, may be of great use in all these cases, and of themselves may often effect a cure. The exercises which may be successfully applied for this purpose are Trunk

it should be maintained for a moment. Then the ribs should be allowed to recede slowly, but completely, so that the cavity of the chest becomes narrowed and the air which had filled the lungs is expelled. In this manner, inspiration and expiration should alternate in a regular tempo. The inspiration should take place chiefly through the nose, with the mouth shut or only slightly opened.

Torsion, Trunk Bending, Trunk Rotation, Stamping, Leg Spreading, Swinging, and Rotation, Knee Lifting, the Spread Walk and Walk of Ascent, the Spread Run and Run of Ascent, the jumping exercises, Stepping up on and over the Wand, the Hewing Movement, the Mill with Bend, and finally Shifting the Dumb-bells; in fact all those exercises which act on the muscles of the abdomen, which exert an alternating pressure on the organs of the abdominal cavity and move the intestines to and fro (Exercises, pp. 88-90).

**3. Corpulence, plethora of blood, and rush of blood to the head and chest.**

A combination of these conditions is often found to exist in persons of middle age, who live in good and well assured circumstances and who are in the habit of taking ample and rich food, but whose inclination to ease renders them averse to exercise. By increased deposits of fat in the body, the heart is frequently enveloped in it, and fatty degeneration, in spots, of the muscle of the heart ensues. Such conditions bring about troubles of respiration and palpitations of the heart whenever more active exercise than usual is taken, and paralysis of the heart or apoplexy threatens to appear.

If corpulence has not yet progressed so far as to have allowed the heart and its action to suffer, and if troubles of respiration and congestion in the head and chest are **not yet easily** brought on, regular and active exercise, stimulating the minute tissue changes of the body by means of muscular exertion, is to be recommended as means to a cure. In combination with it a diet should be adopted which shall exclude all fats and all foods that produce fat. Cold baths also should be taken. For these purposes those forms of home gymnastics may be highly recommended which produce an active excitement, such as: Arm Swinging forward and backward, Arm Thrusting, the Hashing Movement, the Chopping Movement, Leg Spreading and Swinging, the Jumping Exercises, the Spread Run and Run of Ascent, the Hewing and the Mowing Movements, and the Mill with Bend (Exercises, pp. 90, 91). Besides these, extended walking trips and mountain climbing are particularly well adapted to such cases.

But if **rush of blood to the head and to the chest**, perhaps also dizziness, are easily brought on, then quieter movements, such as draw the blood from the upper portion of the body, should be



selected. To these movements belong Leg Raising and Swinging in a slow tempo, Leg Rotation, Drawing the Legs together, Knee Raising forward and Leg Stretching, Raising the Lower Leg, the Little Knee Bend, and the Alternate Knee Bend, the Spread Walk and Walk of Ascent, Foot Bending, Foot Balancing, Foot Torsion, Foot Rotation, and Hand Friction (Exercises, pp. 91, 92). Mountain trips which require hard climbing cannot be recommended, for the reason that the proper degree of exertion involved cannot be regulated with sufficient accuracy and is easily exceeded, with great danger to the patient.

**4. Asthmatic troubles, want of breath, shortness of breath, oppression in the chest.**

Asthmatic troubles may arise without traceable disease in any particular organ, but simply as nervous disturbances. They may, however, also appear as troubles following in the wake of diseases of the lungs, such as catarrh or emphysema, or of diseases of the heart, arising from defects in the valves.

In every such case, bodily exercises which strengthen the muscles of respiration and improve its activity will be of service. It should be remembered, however, that in all cases in which asthmatic troubles originate in affections of the heart, only quiet movements which do not excite the activity of the heart are permissible (Exercises, p. 92).

**5. Abnormities in the carriage of the body, and in its outward form.**

Many deviations from the normal carriage and form of the body can be traced to bad habits, which sometimes began their development as early as childhood, in consequence of the continued repetition of certain activities, sometimes also owing to a state of weakness, especially a weakness of particular groups of muscles. In such cases, properly selected exercises are generally very successful.

**Bent carriage.** This is one of the defects in personal appearance, frequently occurring in the young, in which the vertebral column (both the dorsal part and the cervical part) is bent forward, and in which the chest is compressed, thereby restricting respiration. To correct this defect in the carriage such exercises are successful as strengthen the muscles of the shoulder and the dorsal muscles; also,

such as expand the chest. To this category belong Head and Trunk Bending backward, the Shoulder Movement backward, Arm Spreading, Beating with the Forearm in the Raised Position, Arm Raising and Swinging sideways, Arm Swinging forward and backward, Arm Rotation, and the Mill, Arm Stretching backward downward, the Walk and the Pass with the Wand held backward, and finally Support in Lying Forward (Exercises, pp. 92, 93).

**Crooked carriage of the head.** This is often met with both in children and in adults. It may be produced by lateral curvature of the spinal column, but also solely by bad habits. In every case of such defective carriage, exercises of Head Bending should be taken, and in the direction **opposite** to that of the crookedness.

**Turning the feet inward.** Children who, when standing, walking, or running, show a disposition to turn their feet inward, should be made to turn them sharply **outward**, and in **this** position of the feet to perform exercises with the head, the arms, and the trunk, but especially those in which they stand on their toes, bend their knees, and both walk and run.

**Lateral curvature of the spine.** As early as babyhood this may be produced by carrying the child on **one** arm only, thereby making it lean to **one side only**. Nurses are inclined to carry children on the left arm, and children like to nestle close to their nurses; thus, under such circumstances, leaning towards the right side and bending the vertebral column in the same direction. In this manner an outward curvature of the vertebral column towards the **left** is favored. The best mode of preventing this form of lateral curvature of the spine from originating in the manner pointed out, is to have children carried alternately on the right arm and on the left, and to induce them, in grasping objects, to use **both** hands equally as far as possible.

The most frequent occurrence of lateral curvature of the spine is in children of the school age, and originates in the defective manner of sitting at their desks. But the poor adaptation to these purposes of both the desk and the chair may also give rise to it. The following are the conditions necessary for securing a proper sitting posture: The feet should rest on the floor or on a cricket; the level of the seat should be enough above that of the floor or the cricket to bring the child's thigh into a horizontal position; the

vertical distance between the plane of the desk and that of the seat



Fig. 53.

should be sufficient to allow the child, in its sitting posture, to put

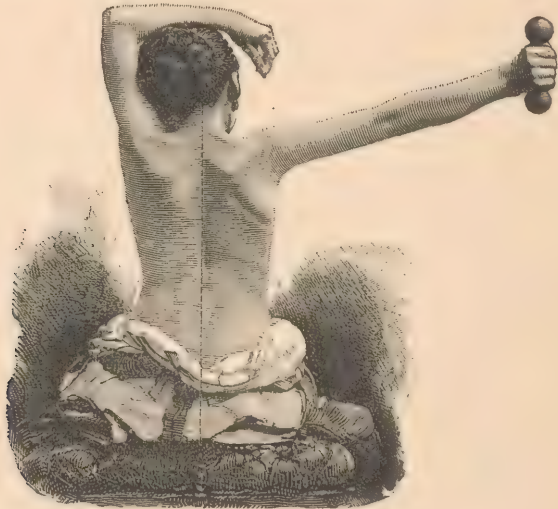


Fig. 54.

the forearms on the desk without making it necessary to bend forward or to lift the upper arms. The plane of the desk should also

project an inch or two beyond the front edge of the plane of the seat.<sup>1</sup> The child should then sit at the desk in such a manner as to bring the line of the chest parallel with the edge of the desk, and to allow both the forearms to rest on it. The child ought not by any means, as happens so often, to sit **crookedly**, generally with the right side turned towards the desk, and with only one arm laid on it.

The defective mode of sitting in school often favors or gives rise to a certain form of lateral curvature of the spine, in which the bend in the dorsal part of the vertebral column is towards the **right**, as shown in Fig. 53. The curvature of the vertebral column in this case is accompanied by a torsion of the axis of those vertebræ which come into play here. This causes an arched projection of the ribs on the right side of the back and a heightening of the right shoulder-blade, while the left side of the back inclines inward and the left shoulder-blade is lowered. It often happens that this form of curvature towards the right is accompanied by a second shorter curvature in the deeper portion of the spine, the convexity of which is towards the left side.

While this curvature to the right of the upper part of the spine remains in its first stages, which may be recognized by the fact that the person affected is still able by the help of another person to straighten himself up, home gymnastics will be found to be a useful counter-agent. By proper positions and movements of the body, not only may the deformity be temporarily obliterated, as is shown in Fig. 54, but improvement and a final cure may be obtained.



Fig. 55.

An important aid to the treatment of the upper curvature of the spine will be found in **deep breathings** affecting especially **one side of the body**, as illustrated in Fig. 55. In this exercise, the patient presses against the ribs the hand of that side of the body towards which the convexity of the spinal curvature is pointed, bends the trunk somewhat towards the same side, bends the arm of the other

<sup>1</sup> See Esmarch: *Zur Belehrung über das Sitzen der Schulkinder*. Kiel: 1884.



side over the head, and breathes slowly and deeply. By so doing that half of the chest which has sunk in is expanded, and the ribs which had become flattened are gradually forced into their arched form again (Exercises, pp. 93, 94).

#### 6. Weakness of the muscles and incipient paralysis.

In cases of weakness of the muscles and incipient paralysis in different parts of the body, gymnastic activity is very useful. For this purpose such exercises should be chosen as will set into activity the portions of the muscles which are weak, and they should be taken at first with moderation, corresponding to the condition of strength, and later with greater intensity proportionate to the increase of strength. Every kind of over-exertion is hurtful in these cases and may destroy the good results obtained from exercises continued for a long time and with much care.

#### 7. St. Vitus-like twitchings and writer's cramp.

In many cases of convulsive disturbance of the muscular system, as, for instance, St. Vitus-like twitchings and writer's cramp, the exercises of home gymnastics may have a good effect.

In cases of **St. Vitus-like twitchings**, the aim should be to regain for the will its power over the muscular system. This should be done by quiet movements, well controlled, and by those exercises of the body which render it difficult to keep the equilibrium — the balancing exercises. The exercises to be recommended for this purpose are: Raising and Lowering the Arms slowly, slow rotation of the arms, the legs, the hands, and the feet, Hand Bending and Rotation, finger exercises, Foot Bending and Torsion, Standing on the Toes and the Soles in slow alternation (especially with a cushion on the head), slow Knee Bending, and Head Bending, Torsion, and Rotation.

In cases of **writer's cramp**, the muscles of the forearm which move the hand should be exercised by quiet movements of Hand Bending, Stretching, and Rotation, and slow but vigorous closing of the fingers into fists, stretching the fingers as well as spreading them apart and bringing them together.

Those persons who have **abdominal ruptures** may use home gymnastics without hesitation if they keep the opening of the rupture closed by a well-fitting bandage and thereby prevent its protrusion. In case the bandage becomes displaced during the exercises, it should be replaced at once.

## GROUPS OF EXERCISES.

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### DIRECTIONS FOR THE PROPER USE OF HOME GYMNASTICS FOR INVALIDS.

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#### PRELIMINARY REMARKS.

1. The exercises are to be taken **daily**.
  2. The exercises are to be performed **exactly** in accordance with the descriptions given in the Second Division, close attention being paid to the positions and movements shown in the illustrations. Exercises in which only **one arm** or only **one leg** is active — except in cases of lateral curvature of the spine — are, as is evident, to be performed with both the right and the left arm or leg, one after the other.
  3. After each exercise a short **pause for rest** should be made, which should be devoted to deep and quiet breathing.
  4. As regards **dress**, the remarks on page 13 should be referred to.
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### GENERAL WEAKNESS, POVERTY OF THE BLOOD, ANÆMIA.

#### XXII.

Each separate exercise is to be taken from four to ten times, interspersed with an ordinary walk.

Exercise.

- 2 a. **Head Bending** forward and backward.
1. **Head Torsion** to the left and to the right (Fig. 1).
6. **Trunk Bending** sideways, to the left and to the right (Fig. 5).
4. **Trunk Torsion** to the left and to the right (Fig. 3).

10. **Shoulder Movement forward and backward.**
11. **Arm Raising** sideways (Fig. 7).
16. **Arm Rotation** (Fig. 9).
18. **Arm Stretching** forward, upward, and downward (Fig. 12).
19. **Arm Stretching backward** downward (Figs. 13, 14).
23. **Beating with the Forearm** in Ridge Position (Fig. 19).
27. **Hand Rotation.**
30. **Leg Raising** forward and backward (cf. Fig. 22).
33. **Leg Rotation.**
36. **Little Knee Bend** (Fig. 25).
40. **Raising the Lower Leg** (Fig. 29).
41. **Standing on the Toes and on the Soles** alternately (Fig. 30).

## XXIII.

Each separate exercise is to be taken from four to ten times, interspersed with a walk with the wand held backward (cf. Exercises 66 and 67, Figs. 50 and 51).

## Exercise.

1. **Head Torsion** to the left and to the right (Fig. 1).
- 2 *b*. **Head Bending** sideways, to the left and to the right (Fig. 2).
4. **Trunk Torsion** with the arms raised forward (Fig. 3).
5. **Trunk Bending** forward and backward (Fig. 4).
- 58 *a*. **Wand Raising** forward to a horizontal position of the arms.
- 58 *b*. **Wand Raising** over the head (Fig. 41).
62. **Wand Lowering** sideways (Fig. 45).
- 59 *a*. **Wand Lowering backward** till the arms are bent (Fig. 42, *a*, *b*).
- 64 *a*. **Arm Stretching sideways** from the Bending Position forward (Fig. 47).
26. **Hand Bending** and Stretching (Fig. 20).
30. **Leg Raising** diagonally forward and backward.
36. **Little Knee Bend** with Arm Raising and Lowering (Fig. 25).
49. **Jump with Heels Together.**
- 38 *a*. **Alternate Knee Bend**, in a Pace Position forward (Fig. 27).
41. **Foot Balancing.**

## DEFECTIVE FORMATION OF THE RESPIRATORY ORGANS. WEAK CHEST.

### XXIV.

Each separate exercise is to be taken from four to ten times, interspersed with a walk with the wand held backward (cf. Exercises 66 and 67, Figs. 50 and 51).

#### Exercise.

- 2 *a.* **Head Bending** backward.
5. **Trunk Bending** backward (Fig. 4).
9. **Shoulder Raising**.
11. **Arm Raising** sideways (Fig. 7).
16. **Arm Rotation** (Fig. 9).
15. **Arm Spreading**.
18. **Arm Stretching** upward and downward (Fig. 12).
19. **Arm Stretching backward** downward (Figs. 13, 14).
60. **Raising the Wand over** with Both Arms (Fig. 43).
62. **Wand Lowering** sideways, to the right and to the left (Fig. 45).
36. **Little Knee Bend**, with Arm Raising sideways (Fig. 25).
41. **Foot Balancing** (Fig. 30).

### XXV.

Each separate exercise is to be taken from four to ten times, interspersed with a walk with the wand held backward (cf. Exercises 66 and 67, Figs. 50 and 51).

#### Exercise.

3. **Head Rotation**.
6. **Trunk Rotation** sideways, to the right and to the left (Fig. 5).
10. **Shoulder Movement forward and backward**.
13. **Arm Swinging** sideways (cf. Fig. 7).
17. **The Mill** with Both Arms, gently (Fig. 10).
22. **Beating with the Forearm** in Raised Position, with moderate Swing (Fig. 17).
- 58 *b.* **Wand Raising** over the head (Fig. 41).
59. **Wand Lowering** backward (Fig. 42).



63. **Raising the Wand over** with One Arm, to the left and to the right (Fig. 46).

64 *b*. **Arm Stretching sideways** from the Bending Position backward (Fig. 48).

57. **Support in Lying Forward**, with Arm Bending (Figs. 38, 39).

36. **Little Knee Bend**, with Arm Stretching upward (Fig. 25).

41. **Foot Balancing**, with a cushion on the head (Fig. 30).

## STAGNATION IN THE ABDOMINAL ORGANS.

### COSTIVENESS, HEMORRHOIDS, ETC.

#### A. For Men.

#### XXVI.

Each separate exercise is to be taken from eight to sixteen times, interspersed with the Spread Walk (Exercise 45) and the Walk of Ascent (Exercise 46).

Exercise.

5. **Trunk Bending** forward and backward (Fig. 4).
4. **Trunk Torsion** (Fig. 3).
8. **Trunk Rotation.**
14. **Arm Swinging** forward and backward (Fig. 8).
20. **Stamping** (Fig. 16).
54. **Knee Balancing**, with Arm Stretching (Figs. 34, 35).
- 32 *b*. **Leg Swinging** outward and inward (Fig. 23).
50. **Jump into the Straddling Position**, and
35. **Drawing the Legs Together.**
56. **Dumb-bell Shifting** (Fig. 37).
39. **Knee Raising** forward, and Leg Stretching (Fig. 28).

#### XXVII.

Each separate exercise is to be taken from eight to sixteen times, interspersed with the Walk of Ascent (Exercise 46) and the Run of Ascent (Exercise 48 *b*).

Exercise.

7. **Trunk Bending** forward and backward from a Position of Torsion (Fig. 6).

- 53. **Mowing Movement** (Figs. 32, 33).
- 8. **Trunk Torsion.**
- 20. **Arm Thrusting** upward and downward (Fig. 15).
- 52. **Hewing Movement** (Fig. 31).
- 37. **Deep Knee Bend** (Fig. 26).
- 32 a. **Leg Swinging** forward and backward (Fig. 22).
- 51. **Jump Straddling in the Air.**
- 55. **The Mill with Bend** (Fig. 36).
- 69. **Stepping over the Wand** (cf. Fig. 52).

### B. For Women.

#### XXVIII.

Each separate exercise is to be taken from six to twelve times, interspersed with the Run without and with change of base (Exercise 48).

Exercise.

- 5. **Trunk Bending** forward and backward (Fig. 4).
- 6. **Trunk Bending** sideways (Fig. 5).
- 36. **Knee Balancing** (Fig. 25).
- 14. **Arm Swinging** forward and backward (Fig. 8).
- 4. **Trunk Torsion** (Fig. 3).
- 15. **Arm Spreading** with a Swing.
- 52. **Hewing Movement** in the Position at Start (Fig. 31).
- 8. **Trunk Rotation.**
- 18. **Arm Stretching** upward and downward (Fig. 12).
- 53. **Mowing Movement** (Figs. 32, 33).
- 49. **Jump with Heels Together.**
- 41. **Foot Balancing** (Fig. 30).

### CORPULENCE.

#### A. For Men.

#### XXIX.

Each separate exercise is to be taken from six to twenty times, — those marked with an asterisk (\*) with dumb-bells, — to be

interspersed with the Spread Walk (Exercise 45) and the Spread Run (Exercise 48 *c*).

Exercise.

5. **Trunk Bending** forward and backward (Fig. 4).
8. **Trunk Rotation.**
14. \* **Arm Swinging** forward and backward (Fig. 8).
52. \* **Hewing Movement** (Fig. 31).
24. \* **Hashing Movement.**
- 32 *a*. **Leg Swinging** forward and backward (Fig. 22).
22. \* **Beating with the Forearm** in Raised Position (Fig. 17).
37. **Deep Knee Bend** (Fig. 26).
35. \* **Drawing the Legs Together.**
55. \* **The Mill with Bend** (Fig. 36).
49. **Jump with Heels Together.**
53. **Mowing Movement** (Figs. 32, 33).
- 38 *b*. **Alternate Knee Bend** in the Straddling Position.

### XXX.

Each separate exercise is to be taken from six to twenty times, — those marked with an asterisk (\*) with dumb-bells, — interspersed with the Walk of Ascent (Exercise 46) and the Run of Ascent (Exercise 48 *b*).

Exercise.

7. **Trunk Bending** from a Position of Torsion (Fig. 6).
8. **Trunk Rotation.**
53. **Mowing Movement** (Figs. 32, 33).
20. \* **Arm Thrusting** (Fig. 15).
25. \* **Chopping Movement.**
- 32 *b*. **Leg Swinging** outward and inward (Fig. 23).
54. \* **Knee Balancing** with Arm Stretching (Figs. 34, 35).
51. **Jump Straddling in the Air.**
56. **Dumb-bell Shifting** (Fig. 37).
17. \* **The Mill** with Both Arms (Figs. 10, 11).
52. \* **Hewing Movement** (Fig. 31).
- 38 *a*. **Alternate Knee Bend** in a Pace Position forward (Fig. 27).

## B. For Women.

## XXXI.

Each separate exercise is to be taken from six to sixteen times, interspersed with the Spread Walk and the Spread Run, with moderate Forward Stride (Exercises 45 and 48 *c*).

## Exercise.

5. **Trunk Bending** forward and backward (Fig. 4).
8. **Trunk Rotation.**
14. **Arm Swinging** forward and backward (Fig. 8).
53. **Mowing Movement** (Figs. 32, 33).
36. **Knee Balancing** (Fig. 25).
52. **Hewing Movement** from the Position at Start (Fig. 31).
18. **Arm Stretching** upward and downward (Fig. 12).
17. **The Mill** with Both Arms (Fig. 10).
8. **Trunk Rotation.**
24. **Hashing Movement.**
- 38 *a*. **Alternate Knee Bend** in a Pace Position forward (Fig. 27).
41. **Foot Balancing** (Fig. 30).

## RUSH OF BLOOD TO THE HEAD AND CHEST.

## XXXII.

Each separate exercise is to be taken from eight to twenty times, —except the Hand Friction, which is to be taken from twenty to forty times, — interspersed with the Spread Walk with moderate Forward Stride (Exercise 45).

## Exercise.

21. **Hand Friction.**
30. **Leg Raising** forward and backward (cf. Fig. 22).
33. **Leg Rotation**, slowly.
40. **Raising the Lower Leg** (Fig. 29).
24. **Hashing Movement.**
36. **Knee Balancing** (Fig. 25).
34. **Leg Torsion** (Fig. 24).



- 26. **Hand Bending** and Stretching (Fig. 20).
- 44. **Foot Rotation.**
- 39. **Knee Raising forward** and Leg Stretching (Fig. 28); moderately by women.
- 27. **Hand Rotation.**
- 21. **Hand Friction.**

## ASTHMATIC TROUBLES.

### XXXIII.

Each separate exercise is to be taken from six to sixteen times, interspersed with the Walk with Legs Rigid and Wand held backward (Exercise 66, Fig. 50).

Exercise.

- 9. **Shoulder Raising** and Lowering.
- 11. **Arm Raising** sideways (Fig. 7).
- 15. **Arm Spreading.**
- 17. **The Mill** with Both Arms (Fig. 10).
- 19. **Arm Stretching backward** downward (Figs. 13, 14).
- 67. **Pass** with Wand held backward (Fig. 51).
- 58 *b*. **Wand Raising** over the head (Fig. 41).
- 59. **Wand Lowering** backward (Fig. 42).
- 64 *b*. **Arm Stretching sideways** in the Bending Position backward (Fig. 48).
- 63. **Wand Raising over** with One Arm, to the left and to the right (Fig. 46).
- 57. **Support in Lying Forward**, with Arm Bending (Figs. 38, 39).
- 10. **Shoulder Movement forward and backward.**

## BENT CARRIAGE.

### XXXIV.

Each separate exercise is to be taken from six to sixteen times, interspersed with the Walk with Legs Rigid and Wand held backward (Exercise 66, Fig. 50).

Exercise.

- 2 *a.* Head Bending **backward**.
10. Shoulder Movement **backward**.
19. **Arm Stretching backward** downward (Figs. 13, 14).
5. Trunk Bending **backward** (Fig. 4).
15. **Arm Spreading**.
22. **Beating with the Forearm** in the Raised Position (Fig. 17).
14. **Arm Swinging** forward and backward (Fig. 8).
41. **Standing on the Toes**, with a cushion on the head (Fig. 30).
36. **Little Knee Bend**, with a cushion on the head (Fig. 25).
17. **The Mill** with Both Arms (Fig. 10).
59. **Wand Lowering** backward (Fig. 42).
- 64 *b.* **Arm Stretching sideways** in the Bending Position backward (Fig. 48).
67. **Pass** with the Wand held backward (Fig. 51).
60. **Wand Raising over** with Both Arms (Fig. 43).

## LATERAL CURVATURE OF THE SPINE.

Cases in which the Upper Part of the Spinal Column bends to the **RIGHT**.<sup>1</sup>

In the pauses between the various exercises the position illustrated in Fig. 54, page 82 (the left arm bent over the head, the right arm raised sideways, weighted with a dumb-bell or a similar object), is to be taken. Deep breaths on one side should then be drawn, during which, while the left arm remains bent over the head, the right hand is pressed against the side of the chest (cf. Fig. 55, page 82).

### XXXV.

Each separate exercise is to be taken from ten to twenty times.

Exercise.

11. **Arm Raising** sideways, moderately (Fig. 7).
9. Shoulder Movement **to the left**.
5. Trunk Bending **backward** (Fig. 4), with arms raised high.
6. Trunk Bending **sideways to the right**, with the left arm bent over the head (cf. Figs. 5, 54).

<sup>1</sup> In cases in which the upper part of the spinal column bends to the **left**, the one-sided movements are to be taken in the opposite direction from that given in the exercises.

- 10. **Shoulder Movement forward and backward.**
- 16. **Arm Rotation** (Fig. 9).
- 19. **Arm Stretching backward** downward (Figs. 13, 14).
- 36. **Little Knee Bend** (Fig. 25), with arms raised sideways.
- 22. **Beating with the Forearm** in Raised Position<sup>1</sup> (Fig. 17).
- 17. The Mill with the **Left Arm** (cf. Fig. 10).
- 41. **Standing on the Toes**, with a cushion on the head (Fig. 30).

## XXXVI.

Each separate exercise is to be taken from ten to twenty times.

Exercise.

- 15. **Arm Spreading.**
- 19. **Arm Stretching backward** downward (Figs. 13, 14).
- 23. **Beating with the Forearm** in the Ridge Position<sup>1</sup> (Fig. 19).
- 6. Trunk Bending **sideways to the right** with the left arm bent over the head (cf. Figs. 5, 54).
- 59 *a*. **Wand Lowering backward** until the arm is bent (Fig. 42, *a*, *b*).
- 64 *b*. Arm Stretching sidewise **to the right** in the Bending Position backward (Fig. 48).
- 63. **Wand Raising over** with the left arm (Fig. 46).
- 61. Wand Weighing **to the left** (Fig. 44).
- 62. Wand Lowering sideways **to the right** (Fig. 45).
- 65. **Wand Swinging sideways**, with Trunk Torsion (Fig. 49) ; only on the right side.
- 36. **Little Knee Bend** with Wand held backward (cf. Figs. 25, 51).
- 41. **Standing on the Toes**, with a cushion on the head (Fig. 30).

<sup>1</sup> More vigorously with the right arm than with the left.



# HOME GYMNASTICS

## FOR THE WELL AND THE SICK.

BY

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### EXERCISES.

#### I. MOVEMENTS OF THE HEAD.

##### EXERCISES FOR THE NECK.

1. Head Torsion (Fig. 1).
2. Head Bending.
  - a. Forward and backward.
  - b. Left and right sideways (Fig. 2).
3. Head Rotation.

#### II. EXERCISES FOR THE TRUNK.

4. Trunk Torsion (Fig. 3).
5. Trunk Bending forward and backward (Fig. 4).
6. Trunk Bending sideways (Fig. 5).
7. Trunk Bending from Position of Torsion (Fig. 6).
8. Trunk Rotation.

#### III. EXERCISES FOR THE ARMS AND HANDS.

9. Shoulder Raising.
10. Shoulder Movement forward and backward.
11. Arm Raising sideways (Fig. 7).
12. Arm Raising forward.
13. Arm Swinging sideways.
14. Arm Swinging forward and backward (Fig. 8).
15. Arm Spreading.
16. Arm Rotation (Fig. 9).
17. The Mill (Figs. 10, 11).
18. Arm Bending and Stretching (Fig. 12).
19. Arm Stretching backward downward (Figs. 13, 14).
20. Arm Thrusting.
21. Hand Friction.
22. Beating with Forearm in Raised Position (Figs. 17, 18).
23. Beating with Forearm in Ridge Position (Fig. 19).
24. Hatching Movement.
25. Chopping Movement.
26. Hand Bending and Stretching (Fig. 20).
27. Hand Rotation.
28. Finger Bending and Stretching.
29. Finger Spreading.

#### IV. EXERCISES FOR THE LEGS AND FEET.

30. Leg Raising.
  - a. Sideways (Fig. 21).
  - b. Forward and backward (cf. Fig. 22).
  - c. Diagonally forward and backward.
31. Leg Spreading.
32. Leg Swinging.
  - a. Forward and backward (Fig. 22).
  - b. Outward and inward (Fig. 23).
33. Leg Rotation.
34. Leg Torsion (Fig. 24).
35. Drawing the Legs Together.
36. Little Knee Bend (Fig. 25).
37. Deep Knee Bend (Fig. 26).

38. Alternate Knee Bend.
  - a. In forward Pace Position (Fig. 27).
  - b. In Straddling Position.
39. Knee Raising forward and Leg Stretching (Fig. 28).
40. Raising the Lower Leg (Fig. 29).
41. Standing on the Toes (Fig. 30).
42. Foot Bending.
43. Foot Torsion.
44. Foot Rotation.

#### WALKING, RUNNING, JUMPING.

45. Spread Walk with Forward Stride.
46. Walk of Ascent.
47. Walk, Raising the Lower Leg.
48. Run.
  - a. With slight Knee Raising.
  - b. As Run of Ascent.
  - c. As Spread Run.
  - d. As Run, Raising the Lower Leg.
49. Jump with Heels Together.
  - a. Without change of base.
  - b. With change of base.
50. Jump into Straddling Position.
51. Straddling Jump.

#### V. COMPOSITE EXERCISES.

52. Hewing Movement (Fig. 31).
53. Mowing Movement (Figs. 32, 33).
54. Knee Balancing with Arm Stretching (Figs. 34, 35).
55. The Mill with Bend (Fig. 36).
56. Dumb-bell Shifting (Fig. 37).
57. Support in Lying Forward (Fig. 38).
58. Arm Bending with Support in Lying Forward (Fig. 39).

#### VI. EXERCISES WITH THE WAND.

59. Holding the Wand before the Body (Fig. 40).
60. Wand Raising.
  - a. Forward into horizontal position of the arms.
  - b. Over the head (Fig. 41).
61. Wand Lowering backward.
  - a. Until the arms are bent (Fig. 42, a, b).
  - b. Until the arms are straight (Fig. 42, a', b').
62. Lifting the Wand over with Both Arms (Fig. 43).
63. Wand Weighing (Fig. 44).
64. Wand Lowering sideways (Fig. 45).
65. Lifting the Wand over with One Arm (Fig. 46).
66. Arm Stretching sideways.
  - a. From Bending Position forward (Fig. 47).
  - b. From Bending Position backward (Fig. 48).
67. Wand Swinging sideways, with Trunk Torsion (Fig. 49).
68. Walk with Legs Rigid and Wand held backward (Fig. 50).
69. Pass with Wand held backward (Fig. 51).
70. Stepping up on the Wand (Fig. 52).
71. Stepping over the Wand.

NOTE 1. The Exercises should be performed in *exact* accordance with the descriptions in "Home Gymnastics," and with due attention to the Positions and Movements illustrated in the Plates.

NOTE 2. Details as to dress are given on page 13 of "Home Gymnastics."



Fig. 1.  
Head Torsion.



Fig. 2.  
Head Bending Sideways.



Fig. 3.  
Trunk Torsion.



Fig. 4.  
Trunk Bending forward and backward.



Fig. 5.  
Trunk Bending sideways.



Fig. 6.  
Trunk Bending in Position of Torsion.

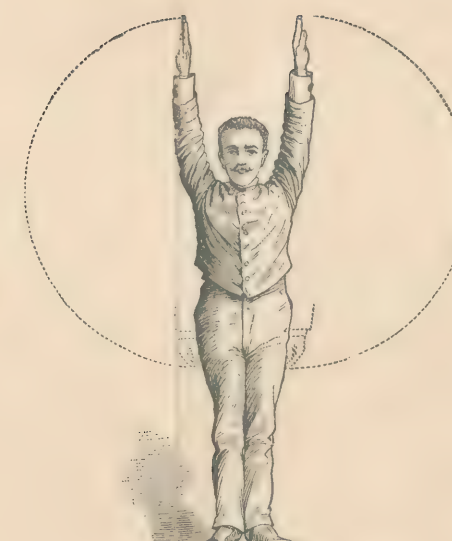


Fig. 7.  
Arm Raising sideways.



Fig. 8.  
Arm Swinging outward and inward.



Fig. 9.  
Arm Rotation.



Fig. 10.  
The Mill.



Fig. 11.  
The Mill.

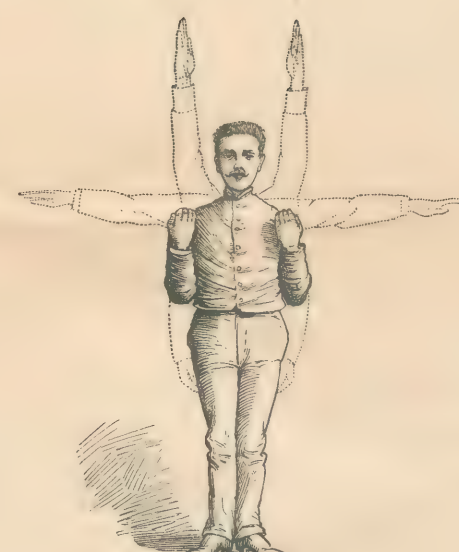


Fig. 12.  
Arm Bending and Stretching.



Fig. 13.

Arm Stretching backward downward.



Fig. 14.



Fig. 15.  
Arm Thrusting.



Fig. 16.  
Alternate Arm Thrusting.



Fig. 17.  
Beating with the Forearm in Raised Position.



Fig. 18.  
Alternate Beating with the Forearm.



Fig. 19.  
Beating with the Forearm in Ridge Position.



Fig. 20.  
Hand Bending and Stretching.



Fig. 21.  
Leg Raising sideways.



Fig. 22.  
Leg Swinging backward and forward.



Fig. 23.  
Leg Swinging outward and inward.



Fig. 24.  
Leg Torsion.



Fig. 25.  
Little Knee Bend.



Fig. 26.  
Deep Knee Bend.



Fig. 27.  
Alternate Knee Bend.



Fig. 28.  
Knee Raising forward and Leg Stretching.



Fig. 29.  
Raising the Lower Leg.



Fig. 30.  
Standing on the Toes.



Fig. 31.  
Hewing Movement.



Fig. 32.

Mowing Movement.



Fig. 33.



Fig. 34.  
Knee Balancing, with Arm Stretching.



Fig. 35.

The Mill with Bend.



Fig. 37.  
Shifting the Dumb-bells.



Fig. 38.  
Support in Lying Forward.



Fig. 39.  
Arm Bending in Support in Lying Forward.



Fig. 40.  
Position of Wand at Commencement.



Fig. 41.  
Raising the Wand over the Head.

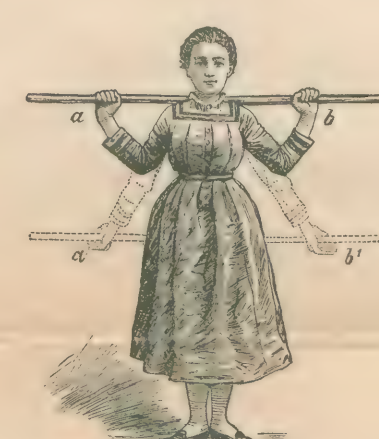


Fig. 42.  
Wand Lowering backward.



Fig. 43.  
Wand Raising over with Both Arms.



Fig. 44.  
Wand Weighing.



Fig. 45.  
Wand Lowering backward.



Fig. 46.  
Raising the Wand over with One Arm.



Fig. 47.  
Arm Stretching sideways from the Bending Position forward.



Fig. 48.  
Arm Stretching sideways from the Bending Position backward.



Fig. 49.  
Wand Swinging sideways, with Trunk Torsion.



Fig. 50.  
Walk with Legs Rigid and Wand held backward.



Fig. 51.

Stepping up on the Wand.



Fig. 52.  
Stepping over the Wand.















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